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ABSTRACT

This teacher's guide contains 13 units of instruction for a course that will prepare students with the entry-level competencies needed by a surgical technologist. The course covers the following topics: introduction to surgical procedures; diagnostic procedures; general surgery; gastrointestinal surgery; obstetrics and gynecological surgery; genitourinary surgery; ear, nose, and throat surgery; ophthalmic surgery; plastic surgery; orthopedic surgery; neurosurgery; thoracic surgery; and cardiovascular and peripheral vascular surgery. Each of the instructional units, which are keyed to similar student units of study, includes some or all of the following basic components of a unit of instruction: objective sheet, suggested activities for the teacher, answers to assignment sheets and written test, written test, unit evaluation form, teacher supplements, transparency masters, information sheets, assignment sheets, student supplements, and job sheets. All of the unit components focus on measurable and observable learning outcomes; they are designed for use in more than one lesson or class period of instruction. In addition to the units of study, the teacher's edition contains instruction for using the publication; a competency profile; an instructional and task analysis, a list of related academic and workplace skills; a tools, equipment and materials list; and a list of 20 references. (KC)

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ED 376 375

Surgical Procedures
Second Edition

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Surgical Procedures

Teacher Edition

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Foreword

When MAVCC began the process for revising our Surgical Technology Series, we wanted to develop a set of instructional materials that would provide secondary and post-secondary students an opportunity to explore the careers in surgical technology. Much has been said about the need for students to have basic cognitive (knowing) and psychomotor (doing) skills to be successful in the workplace. After students have completed *Introduction to Surgical Technology, Surgical Techniques*, and *Surgical Procedures*, they should have the entry-level competencies to be successful in any of the surgical technology occupational areas.

This publication, *Surgical Procedures*, is designed to include the entry-level competencies students will need as a surgical technologist. The success of this publication is due in large part to the capabilities of the personnel who worked with its development. Appreciation is extended to them for their valuable contributions to the publication.

These instructional materials are designed for student use and to assist teachers in organizing and improving instruction. These instructional materials are based on the curriculum alignment concept of first stating the objectives (objective sheet), developing instructional strategies for teaching to those objectives (information, assignment, and job sheets), and assessing to those same objectives (criterion-referenced evaluation instruments).

Every effort has been made to make these materials basic, readable, and by all means, usable. As with all of MAVCC's instructional materials, teachers must localize and personalize these materials to meet their community, classroom/laboratory, and individual student's situation. Teachers are encouraged to supplement the instructional materials and to develop strategies for motivating their students.

Special attention should be given to the matrix (page xxxvii) identifying basic academic skills being reinforced in these instructional materials, as well as each unit's teaching suggestions on ways to reinforce academic and workplace skills. By reinforcing these skills, the instructor should assist students in improving their employability skills.

As you use these instructional materials, we hope that you will find that they contribute to the quality of your program. If any problems occur or if you have any suggestions for improvement of the materials, please call or write us.

Harley Schlichting, Chairman
Board of Directors
Mid-America Vocational
Curriculum Consortium

Jim Steward
Executive Director
Mid-America Vocational
Curriculum Consortium

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Use of Introductory Materials

Introductory materials are included in the teacher edition only and contain useful information to assist administrators and teachers in planning for instruction.

In addition to the general information such as the table of contents, foreword, and acknowledgements page, information is included on the following:

1. **Use of this publication**—Explains the components of a unit of instruction and how they should be used as part of the teaching/ learning process.
2. **Competency profile**—Provides a record of student performance for each task included in a unit of instruction. This becomes a part of the student's permanent records and should be utilized when directing the student toward employment opportunities.
3. **Instructional/task analysis**—Provides a quick review of contents of the publication; identifies cognitive (knowledge) skills and psychomotor (doing) skills addressed in each unit of instruction.
4. **Related academic and workplace skills list**—Classifies unit tasks (assignment sheets and job sheets) according to related academic and workplace skills being reinforced. Skill areas reflected by skill groups, sub skills, and descriptions have been identified using *Workplace Basics: The Skills Employers Want*, developed by the American Society for Training and Development (ASTD) and the U.S. Department of Labor and adapted by MAVCC.
5. **Tools, equipment, and materials list**—Provides a comprehensive list of those items needed to successfully complete the assignment sheets and/or job sheets; assists administrator/teacher in determining program costs.
6. **Reference list**—Provides a comprehensive list of resources used in the development of this publication.

As you use these materials, it is hoped that they will provide useful information to meet a variety of needs.

Use of This Publication

Instructional units

Surgical Procedures contains thirteen units of instruction. Each instructional unit in a teacher edition includes some or all of the following basic components of a unit of instruction: objective sheet, suggested activities for the teacher, answers to assignment sheets, answers to written test, written test, unit evaluation form, teacher supplements, transparency masters, information sheet, assignment sheets, student supplements, and job sheets.

All of the unit components focus on measurable and observable learning outcomes. Teachers are encouraged to supplement, personalize, localize, and motivate with these materials in order to develop a complete teaching/learning process.

Units of instruction are designed for use in more than one lesson or class period of instruction. Careful study of each unit of instruction by the teacher will help to determine the following:

- Amount of materials that can be covered in each class period.
- Skills that must be demonstrated.
- Amount of class time needed for demonstrations.
- Amount of time needed for student practice.
- Supplementary materials, including print and nonprint media and equipment and supplies, that must be ordered.
- Resource people who must be contacted.

Objective sheet (Color code: White)

Each unit of instruction is based on performance objectives which state the goals for successful completion of the course. These performance objectives are stated in two forms: unit objectives which state the expected performance of each student after completion of the unit of instruction, and specific objectives which state what the student must do to reach the unit objective.

The objectives should be provided for students and stressed throughout the teaching/learning process. This will help answer any questions concerning performance requirements for each instructional unit. The objectives can also help determine teaching strategies and instructional methods. Teachers should prepare for each unit by deciding how each objective can best be taught.

Teachers should feel free to modify, delete, or add objectives in order to meet the needs of the students and community. When objectives are added, the teacher should remember to supply the needed information, assignment and/or job sheets, and criterion test items.

Use of This Publication

Suggested activities (Color code: Pink)

This component is included only in the teacher edition. The suggested activities assist teachers during the preparation stage of the teaching/learning process by providing an instructional plan, teaching suggestions, and a list of supplemental resources. Ways to integrate academic and workplace skills have been included in the teacher suggestions, and skill areas have been noted in bold. (A table of academic and workplace skills with accompanying definitions has been provided on page xv.) The teacher should read the suggested activities before teaching the units and decide how each objective can best be taught. Time should also be allowed to obtain supplemental materials, prepare audiovisual materials, and contact outside resources. Duties of the teacher will vary according to the particular unit.

References used in the development of each unit are listed in the suggested-activities section, along with suggested supplemental resources that may be used to teach the unit. These materials can be used by the teacher to supplement her or his knowledge of the subject area or to help students with particular interests or objectives in the area covered.

Instructions for evaluating student performance on the job sheets are also included in the suggested-activities section. Teachers should select and discuss with students the rating scale that will be used.

Assignment and written test answers (Color code: Pink)

Assignment-sheet answers and written-test answers are designed to assist the teacher in evaluation of student performances.

Written test (Color code: Yellow)

This component provides criterion-referenced evaluation of every cognitive objective listed in the unit of instruction. The test appears in the teacher edition only, but duplication is permitted for student use. If objectives have been added, deleted, or modified, appropriate changes should be made on the written test. It is recommended that the tests be divided into shorter tests covering three or four objectives at a time and given soon after those objectives have been covered. A selection of test items from the units covered may be used for final tests at the end of each term if desired.

Unit evaluation form (Color code: White)

This sheet provides teachers with a record of each students performance on a unit of instruction. It includes space for assignment sheet ratings, job sheet ratings, written test scores, and teacher comments. The unit evaluation form is included in the teacher edition only, but may be duplicated.

Use of This Publication

Teacher supplements (Color code: White)

This component is included only in the teacher edition. Teacher supplements are optional materials for the teacher to use. They have three purposes: to provide the teacher with higher level materials to stretch the advanced student, with remedial information or practice to assist the less-advanced student, and with state-of-the-art information in which the teacher may not have background or with information that is not readily available in other books. Some teacher supplements may be duplicated for student use and are marked accordingly.

Transparency masters (Color code: White)

Transparencies are included in the teacher edition only and are used to direct the students' attention to the topic of discussion. They may provide illustrations, charts, schematics, or additional information needed to clarify and reinforce objectives included in the unit of instruction.

Information sheet (Color code: Green)

The information sheet provides the content essential for meeting the cognitive (knowledge) objectives of the unit. Teachers will find that the information sheet serves as an excellent guide for presenting background knowledge necessary to develop the skills specified in the unit objective. Students should read the information sheet before the information is discussed in class. Space is provided in margins for students and teachers to add notes that supplement, localize, personalize, or provide information for the teaching of each objective.

Student supplements (Color code: White)

Student supplements are included in the student edition. The information presented in a student supplement may consist of tables, charts, written information, forms, or other information students will need in order to complete one or more of the assignment and/or job sheets. Students are not directly tested over the information presented in a supplement; however, their ability to apply this information may be evaluated in the completion of assignment sheets or job sheets.

Assignment sheets (Color code: Tan)

Assignment sheets provide students with pencil and paper activities that give students the opportunity to make practical application of the knowledge in the information sheet. Criteria are provided to objectively evaluate student performance.

Use of This Publication

Job sheets (Color code: Blue)

The job sheets provide criteria to objectively evaluate student performance, a list of required equipment and materials, and a step-by-step procedure for performing a psychomotor skill. The teacher should discuss the equipment and materials available in the classroom and/or laboratory and demonstrate the procedure prior to having students practice procedure. When a student is ready to be evaluated, the teacher should follow instructions for evaluating student performance which may be found in the teacher edition.

Job sheets are an important segment of each unit. Job sheets provide potential employers with a picture of the skills being taught during training and the performances that might reasonably be expected from an individual who has had this training.

Disseminating material

Material may be given out a unit or page at a time to keep the material before the student always new. Some teachers ask students to furnish a three-ring binder or folder for the current unit of study. This is convenient for students taking the material home to study. Upon completion, each unit is then placed in a larger binder. Some teachers prefer to store the material by unit in filing cabinets or boxes until needed.

For best results, provide student materials for each student. Student editions contain objective sheets, information sheets, student supplements, assignment sheets, and job sheets. Students should be allowed to take their materials home at the end of the course.

Academic and Workplace Skills
(Classifications and Definitions)

Skill Groups	Sub Skills	Definitions
Learning Skills	Learning to learn	Developing ability to apply knowledge to other situations; knowing how to learn.
Foundation Skills	Reading	Comprehending written information and analyzing, summarizing, and applying what has been read to a specific task.
	Writing	Communicating a thought, idea or fact in written form in a clear, concise manner.
	Math	Applying computation skills such as reasoning, estimation, and problem solving as they are actually used on the job.
	Science	Applying knowledge learned through study or practice that is based on scientific principles as they relate to specific tasks.
Communication Skills	Listening	Listening for content, conversation, long-term contexts, emotional meaning, and directions.
	Oral communication	Communicating a thought, idea, or fact in spoken form in a clear, concise manner.
Adaptability Skills	Creative thinking	Using imagination to create something new—i.e. an idea, invention, work of art.
	Problem solving (critical thinking)	Recognizing and defining problems, inventing, and implementing solutions, and tracking and evaluating results.
Personal Management Skills	Self-esteem	Developing self-confidence and creating a positive self-image.
	Motivation/goal setting	Setting and meeting defined goals and objectives.
	Personal and career development	Emphasizing self-direction by establishing and implementing a plan.
Group Effectiveness Skills	Interpersonal relations	Developing ability to maintain positive relations with others.
	Negotiation	Resolving conflict between two or more individuals.
	Teamwork	Working together in a group to reach a common goal.
Influence Skills	Organizational effectiveness	Adapting to the organization's goals, values, culture, and traditional modes of operation.
	Leadership	Directing/influencing group in performance of a specific task; accepting responsibility for others.

Surgical Procedures

Competency Profile

Name: ________________________________

Directions: Evaluate the student using the rating scale below. Write the appropriate number to indicate the degree of competency achieved. The descriptions associated with each of the numbers focused on a level of student performance for each of the tasks listed. The written test scoreline is provided for optional teacher use. It may not be applicable in all cases.

Option A

Rating scale:
4 - Skilled - Can perform job with no additional training.
3 - Moderately Skilled - Has performed job during training program; limited additional training may be required.
2 - Limited Skill - Has performed job during training program; additional training is required to develop skill.
1 - Unskilled - Is familiar with process, but is unable to perform job.
0 - No Exposure - No information or practice provided during training program, complete training required.
NA - Non-applicable.

Option B

Yes - Can perform with no additional training
No - Is unable to perform satisfactorily

Unit 1: Introduction to Surgical Procedures

______1. Draw and label common abdominal incisions.
______2. Determine abdominal incisions required for various surgeries.
______3. ________________________________

______Written Test Score

Unit 2: Diagnostic Procedures

______1. Distinguish among diagnostic procedures
______2. ________________________________

______Written Test Score

Unit 3: General Surgery

______1. Determine needs for given cases involving general surgery.
______2. ________________________________

______Written Test Score

Competency Profile

Unit 4: Gastrointestinal Surgery

______1. Determine needs for given gastrointestinal surgery cases.
______2. ____

______Written Test Score

Unit 5: Obstetrics and Gynecological Surgery

______1. Determine needs for given obstetrics and gynecological surgery cases.
______2. ____

______Written Test Score

Unit 6: Genitourinary Surgery

______1. Determine needs for selected urological surgery patients and procedures.
______2. Insert a straight catheter in a female patient.
______3. Insert a straight catheter in a male patient.
______4. Insert a Foley catheter in a female patient.
______5. ____

______Written Test Score

Unit 7: Ear, Nose, and Throat Surgery

______1. Determine needs for given ear; nose, and throat surgery cases.
______2. ____

______Written Test Score

Unit 8: Ophthalmic Surgery

______1. Determine needs for given ophthalmic surgery cases.
______2. ____

______Written Test Score

Unit 9: Plastic Surgery

______1. Determine needs for given plastic surgery cases.
______2. ____

______Written Test Score

Competency Profile

Unit 10: Orthopedic Surgery

______1. Determine needs for given orthopedic surgery cases.
______2. Position a pneumatic tourniquet cuff.
______3. ______________________________

______Written Test Score

Unit 11: Neurosurgery

______1. Determine needs for given neurosurgical cases.
______2. ______________________________

______Written Test Score

Unit 12: Thoracic Surgery

______1. Determine needs for given thoracic surgery cases.
______2. Connect chest tube to disposable chest drainage system.
______3. ______________________________

______Written Test Score

Unit 13: Cardiovascular and Peripheral Vascular Surgery

______1. Determine needs for given cardiovascular and peripheral vascular surgery cases.
______2. ______________________________

______Written Test Score

COMMENTS: ______________________________

____

____

____

____

Evaluator: ______________________ Date: ______________

*** Permission to duplicate this profile is granted.**

Surgical Procedures

Instructional/Task Analysis

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 1: Introduction to Surgical Procedures

1. Suffixes relating to surgical procedures
2. Primary goal of surgical intervention
3. Reasons for surgical intervention
4. Types of surgical complications
5. Common abdominal incisions
6. Common uses for abdominal incisions
7. Layers of abdominal tissues
8. Difference between a laparotomy and an exploratory laparotomy
9. Basic instruments needed for an exploratory laparotomy
10. Duties of the surgical technologist in an exploratory laparotomy
11. Use of lasers in surgery
12. Types of lasers
13. Laser system parts
14. Precautions for using lasers
15. Draw and label common abdominal incisions.
16. Determine abdominal incisions required for various surgeries.

Instructional/Task Analysis

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 2: Diagnostic Procedures

1. Terms and definitions
2. Common methods of diagnosis
3. Radiology equipment used in diagnostic procedures
4. Characteristics of computed tomography scans
5. Basic pathology diagnostic procedures
6. Types of endoscopes
7. Characteristics of ultrasonography
8. Characteristics of magnetic resonance imaging
9. Diagnostic procedures performed in surgical specialties
10. Common features of angiographic procedures
11. Percutaneous transluminal coronary angioplasty
12. Steps for a pacemaker insertion

13. Distinguish among diagnostic procedures.

Unit 3: General Surgery

1. Terms and definitions
2. Purpose of a herniorrhaphy
3. Special terms relating to hernia surgery

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do

Unit 3: General Surgery (continued)

4. Regions of the abdomen where hernias may occur
5. Types of hernias
6. Parts of Hesselbach's triangle
7. Direct and indirect hernias
8. Special features of hernia surgery
9. Basic instruments required for hernia surgery
10. Procedure for an inguinal herniorrhaphy
11. Procedure for a laparoscopic hernia repair
12. Anatomy of the thyroid gland
13. Purpose of thyroid surgery
14. Main disorders of the thyroid
15. Basic surgical procedures on the thyroid
16. Special features of thyroid surgery
17. Basic instruments required for thyroid surgery
18. Procedure for a subtotal thyroidectomy
19. Anatomy of the parathyroid gland
20. Diseases of the parathyroid gland

Instructional/Task Analysis

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 3: General Surgery (continued)

21. Basic procedures in parathyroid surgery
22. Special features of parathyroid surgery
23. Anatomy of the breast
24. Purpose of breast surgery
25. Special features of breast surgery
26. Types of breast incisions
27. Basic breast procedures
28. Basic instruments required for breast surgery
29. Procedure for an excisional breast biopsy
30. Procedure for a modified radical mastectomy
31. Special techniques for cancer

32. Determine needs for given cases involving general surgery.

Unit 4: Gastrointestinal Surgery

1. Terms and definitions
2. Endoscopic procedures commonly used in gastrointestinal surgery
3. Types of anastomoses
4. Operations on the biliary tract
5. Indications for biliary tract surgery
6. Procedure for a cholecystectomy with operative cholangiogram

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 4: Gastrointestinal Surgery (continued)

7. Procedure for a laparoscopic cholecystectomy
8. Operations on the liver, spleen, and pancreas
9. Special bowel techniques used during intestinal surgery
10. Two basic bowel techniques
11. Gastric procedures
12. Procedure for a Billroth II
13. Procedure for a pyloromyotomy
14. Operations on the intestine
15. Indications for resections of the small and large intestines
16. Procedure for a resection of the small intestine
17. Procedure for an appendectomy
18. Procedure for a laparoscopic appendectomy
19. Characteristics of abdominoperineal resection
20. Operations on the anorectal region
21. Procedure for a hemorrhoidectomy
22. Specialized instruments for gastrointestinal surgery

23. Determine needs for given gastrointestinal surgery cases.

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 5: Obstetrics and Gynecological Surgery

1. Terms and definitions
2. Purposes of obstetrics and gynecological surgery
3. Types of abortions
4. Common obstetrical complications
5. Common gynecological complications
6. Diagnostic techniques used by gynecologists
7. Abdominal procedures
8. Vaginal procedures
9. Applications of lasers for gynecological surgery
10. Types of genital fistulas
11. Special features of obstetric and gynecologic surgery
12. Basic obstetrical and gynecological medications and solutions
13. Specialized instruments for obstetric and gynecological surgery
14. Procedure for a dilation and curettage
15. Procedure for the repair of a cystocele and rectocele
16. Procedure for a vaginal hysterectomy
17. Procedure for an abdominal hysterectomy

Related Information: What the Student Should Know	**Application: What the Student Should Be Able to Do**
Unit 5: Obstetrics and Gynecological Surgery (continued)	
18. Procedure for a laparoscopy	22. Determine needs for given obstetrics and gynecological surgery cases.
19. Types of hysterectomies	
20. Indications for a cesarean section	
21. Procedure for a cesarean section	
Unit 6: Genitourinary Surgery	
1. Terms and definitions	
2. Diseases and anomalies of the urinary tract	
3. Diagnostic procedures and laboratory tests	
4. Common types of urethral/ureteral catheters	
5. Characteristics of ureteral catheters	
6. Characteristics of suprapubic catheters	
7. Sizing of catheters and their uses	
8. Factors to consider when catheterizing a patient	
9. Classes of genitourinary procedures	
10. Instruments, supplies, and equipment used during a cystoscopy	
11. Cystoscope components	
12. Special considerations during cystoscopy	
13. Duties of the surgical technologist before, during, and after a cystoscopy	

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 6: Genitourinary Surgery (continued)

14. Procedure for a cystoscopy
15. Characteristics of a resectoscope
16. Operations on the penis and urethra
17. Operations on the scrotum
18. Types of prostatectomies
19. Open operations on the bladder
20. Operations on the kidney and ureter
21. Incisional approaches to the kidney
22. Characteristics of an adrenalectomy
23. Kidney transplanting
24. Procedure for circumcision
25. Procedure for an orchiectomy
26. Procedure for a transurethral resection of the prostate gland
27. Procedure for a nephrectomy
28. Procedure for a ureterolithotomy

29. Determine needs for selected urological surgery patients and procedures.
30. Insert a straight catheter in a female patient.
31. Insert a straight catheter in a male patient.
32. Insert a Foley catheter in a female patient.

Unit 7: Ear, Nose, and Throat Surgery

1. Basic purposes of ear, nose, and throat surgeries
2. Terms and definitions related to the ear
3. Common otologic procedures
4. Special features of otologic procedures

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
Unit 7: Ear, Nose, and Throat Surgery (continued)	
5. Specialized instruments for otological procedures	18. Determine needs for given ear, nose, and throat surgery cases.
6. Procedure for a myringotomy with insertion of PE tubes	
7. Terms and definitions related to the nose	
8. Common nasal operative procedures	
9. Special features of nasal procedures	
10. Specialized instruments for nasal procedures	
11. Procedure for a septoplasty	
12. Endoscopic sinus procedures	
13. Terms and definitions related to the oral cavity and throat	
14. Common operative procedures on the oral cavity and throat	
15. Special features of operative procedures	
16. Specialized instruments for throat procedures	
17. Procedure for a tonsillectomy and adenoidectomy	
Unit 8: Ophthalmic Surgery	
1. Terms and definitions	
2. Purpose of ophthalmic surgery	
3. Basic procedures to correct extraocular conditions	

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do

Unit 8: Ophthalmic Surgery (continued)

4. Procedures to correct intraocular conditions
5. Procedures for removal of the eye
6. Special considerations for ophthalmic surgery
7. Drugs for ophthalmic surgery
8. Specialized instruments for ophthalmic surgery
9. Steps for an intracapsular cataract extraction

10. Determine needs for given ophthalmic surgery cases.

Unit 9: Plastic Surgery

1. Terms and definitions
2. Purposes of plastic surgery
3. Common craniofacial plastic procedures
4. Common plastic procedures on other areas of the body
5. Special features of plastic surgery
6. Procedure for an augmentation mammoplasty
7. Types of burns
8. Classes of burns according to depth
9. Types of skin grafts
10. Types of autografting techniques
11. Types of free grafts
12. Types of tissue flaps

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 9: Plastic Surgery (continued)

13. Types of dermatomes
14. Considerations in the care of burn patients
15. Special considerations for skin grafting procedures
16. Specialized instruments, equipment, and supplies for plastic surgery

17. Determine needs for given plastic surgery cases.

Unit 10: Orthopedic Surgery

1. Terms and definitions
2. Purpose of orthopedic surgery
3. Special features of orthopedic surgery
4. Positioning, prepping, and draping for orthopedic surgery
5. Special equipment and supplies used in orthopedic surgery
6. Special abbreviations used in orthopedic surgery
7. Preoperative diagnostic work that may be required for orthopedic surgery
8. Use of pneumatic tourniquets
9. Specialized orthopedic instruments
10. Use of air-powered instruments
11. Types of orthopedic surgery
12. Five stages of bone healing
13. Classifications of fractures

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 10: Orthopedic Surgery (continued)

14. Types of fractures
15. Methods for treating fractures
16. Requirements of casts
17. Types of casting materials
18. Characteristics of plaster casts
19. Types of common casts
20. Treatment for common fracture sites
21. Characteristics of tendon and ligament repairs
22. Characteristics of arthroscopic surgery
23. Procedure for arthroscopic surgery of the knee
24. Characteristics of reconstructive joint surgery
25. Procedures used in joint reconstructions
26. Common orthopedic procedures performed on selected parts of the body

27. Determine needs for given orthopedic surgery cases.
28. Position a pneumatic tourniquet cuff.

Unit 11: Neurosurgery

1. Terms and definitions
2. Indications for neurosurgery
3. Neurologic conditions and anomalies
4. Neurologic diagnostic procedures

Unit 11: Neurosurgery (continued)

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
5. Special equipment and supplies used in neurosurgery	15. Determine needs for given neurosurgical cases.
6. Mechanical and chemical methods of hemostasis used during neurosurgery	
7. Positions that may be used for various neurosurgical procedures	
8. Special considerations of neurosurgical procedures	
9. Cranial neurosurgical procedures	
10. Procedure for a craniotomy	
11. Spinal neurosurgical procedures	
12. Procedure for an anterior cervical laminectomy and fusion	
13. Surgical procedures involving peripheral nerves	
14. Specialized instruments used in neurosurgery	

Unit 12: Thoracic Surgery

1. Terms and definitions
2. Purposes of thoracic surgery
3. Special considerations of thoracic surgery
4. Types of thoracic procedures
5. Positions used for thoracic procedures
6. Purposes of thoracic endoscopic. procedures

Unit 12: Thoracic Surgery (continued)

Related Information: What the Student Should Know

7. Endoscopic procedures commonly used in thoracic surgery
8. Incisional approaches to the thoracic cavity
9. Operations on the lung
10. Procedures in the mediastinum
11. Specialized instruments for thoracic surgery
12. Underwater chest drainage systems
13. Procedure for an open thoracotomy

Application: What the Student Should Be Able to Do

14. Determine needs for given thoracic surgery cases.
15. Connect chest tube to disposable chest drainage system.

Unit 13: Cardiovascular and Peripheral Vascular Surgery

Related Information: What the Student Should Know

1. Terms and definitions
2. Special supplies and equipment used in cardiovascular and peripheral vascular surgery
3. Drugs commonly used in cardiovascular and peripheral vascular surgery
4. Two common diagnostic procedures used in cardiovascular and peripheral vascular surgery
5. Cardiovascular and peripheral vascular pathology
6. Types of aortic aneurysms
7. Congenital anomalies of the cardiovascular system
8. Special considerations of cardiovascular surgery

Unit 13: Cardiovascular and Peripheral Vascular Surgery (continued)

Related Information: What the Student Should Know	**Application: What the Student Should Be Able to Do**
9. Specialized instruments for cardiovascular surgery 10. Cardiopulmonary bypass (extracorporeal circulation) 11. Procedures requiring cardiopulmonary bypass 12. Procedures that do **not** require cardiopulmonary bypass 13. Procedure for the insertion of transvenous electrodes and implantation of a permanent pacemaker 14. Special considerations of peripheral vascular surgery 15. Peripheral vascular operations 16. Procedure for an abdominal aortic aneurysmectomy with graft implantation 17. Procedure for an arterial embolectomy 18. Procedure for a carotid endarterectomy	19. Determine needs for given cardiovascular and peripheral vascular surgery cases.

Related Academic and Workplace Skills For *Surgical Procedures*

Task	Skill Group	Sub Skill	Description
Unit 1: Introduction to Surgical Procedures			
Draw and label common abdominal incision. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words
Determine abdominal incisions required for various surgeries. (A.S. 2)	Foundation Skills	Reading	Reads and follows written directions; applies technical words
Unit 2: Diagnostic Procedures			
Distinguish among diagnostic procedures. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; recalls important details from written information
Unit 3: General Surgery			
Determine needs for given cases involving general surgery. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Unit 4: Gastrointestinal Surgery			
Determine needs for given gastrointestinal surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 5: Obstetrics and Gynecological Surgery			
Determine needs for given obstetrics and gynecological surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Unit 6: Genitourinary Surgery			
Determine needs for selected urological surgery patients and procedures. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Insert a straight catheter in a female patient. (J.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies information to job performance
		Science	Demonstrates understanding of human anatomy and physiology
	Communication Skills	Oral communication	Speaks in a clear, concise manner
	Group Effectiveness Skills	Interpersonal relations	Applies human relations skills; cares for patient's needs

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 6: Genitourinary Surgery			
Insert a straight catheter in a male patient. (J.S. 2)	Foundation Skills	Reading	Reads and follows written directions; applies information to job performance
		Science	Demonstrates understanding of human anatomy and physiology
	Communication Skills	Oral communication	Speaks in a clear, concise manner
	Group Effectiveness Skills	Interpersonal relations	Applies human relations skills; cares for patient's needs
Insert a Foley catheter in a female patient. (J.S. 3)	Foundation Skills	Reading	Reads and follows written directions; applies information to job performance
		Science	Demonstrates understanding of human anatomy and physiology
	Communication Skills	Oral communication	Speaks in a clear, concise manner
	Group Effectiveness Skills	Interpersonal Relations	Applies human relations skills; cares for patient's needs
Unit 7: Ear, Nose, and Throat Surgery			
Determine needs for given ear, nose, and throat surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 8: Ophthalmic Surgery			
Determine needs for given ophthalmic surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Unit 9: Plastic Surgery			
Determine needs for given plastic surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 10: Orthopedic Surgery			
Determine needs for given orthopedic surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Position a pneumatic tourniquet cuff. (J.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies information to job performance
		Science	Demonstrates understanding of human anatomy and physiology; follows safety guidelines
	Communication Skills	Oral communication	Speaks in a clear, concise manner
	Group Effectiveness Skills	Interpersonal relations	Applies human relations skills; cares for patient's needs
Unit 11: Neurosurgery			
Determine needs for given neurosurgical cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 12: Thoracic Surgery			
Determine needs for given thoracic surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)
Connect chest tube to disposable chest drainage system. (J.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies information to job performance
		Science	Demonstrates understanding of human anatomy and physiology; follows safety guidelines
	Communication Skills	Oral communication	Speaks in a clear, concise manner
	Group Effectiveness Skills	Interpersonal relations	Applies human relations skills; cares for patient's needs
		Teamwork	Works effectively with others to reach a common goal
	Influence Skills	Organizational effectiveness	Understands importance of protecting patient's rights and safety to the organization

Related Academic and Workplace Skills

Task	Skill Group	Sub Skill	Description
Unit 13: Cardiovascular and Peripheral Vascular Surgery			
Determine needs for given ear, nose, and throat surgery cases. (A.S. 1)	Foundation Skills	Reading	Reads and follows written directions; applies technical words; applies information and concepts derived from printed materials
		Writing	Applies rules of grammar, punctuation, capitalization, and spelling; uses technical words; organizes information into an appropriate format
	Adaptability Skills	Problem solving	Demonstrates logical reasoning in reaching a conclusion
	Influence Skills	Organizational effectiveness	Understands modes of operation of the organization (surgical suite)

Tools, Equipment, and Materials List

Antiseptic solution
Basin, collecting
Bath blanket or drape
Bed protector
Catheters
  - Straight, size 16 Fr.
  - Foley, size specified by physician
Clamps, 2, sterile
Connector, straight
Cotton balls
Disposable chest drainage system (such as Pleur-Evac®)
Drainage tubing and bag
Drapes
Dressing material
Forceps
Gloves
Lubricant
Pneumatic cuff of selected size
Prep solution
Prep tray
Receptacle for urine
Soap and water
Specimen bottle with cap and label
Syringe, 60 cc, irrigating
Tape and scissors
Tubing, connecting
Washcloth and towel
Webril, soft, roll, or similar sheet wadding
Water, sterile

Surgical Procedures

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Zollinger/Zollinger. *The Atlas of Surgical Operations*, 6th ed. New York: Macmillan Publishing Company, 1988.

Introduction to Surgical Procedures
Unit 1

Objective Sheet

Unit Objective

After completing this unit, the student should be able to identify common abdominal incisions, describe their uses, and distinguish among the types of lasers used in surgery. The student should demonstrate these competencies by completing the assignment sheets and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match suffixes relating to surgical procedures with their correct definitions.
2. State the primary goal of surgical intervention.
3. Match reasons for surgical intervention with the correct descriptions.
4. List types of surgical complications.
5. Identify common abdominal incisions.
6. List common uses for abdominal incisions.
7. List in order the layers of abdominal tissues.
8. Define a laparotomy and an exploratory laparotomy.
9. List basic instruments needed for an exploratory laparotomy.
10. Describe duties of the surgical technologist in an exploratory laparotomy.
11. Complete statements concerning the use of lasers in surgery.
12. Distinguish among the types of lasers.
13. Match laser system parts with the correct descriptions.
14. Discuss precautions for using lasers.

Objective Sheet

15. Draw and label common abdominal incisions. (Assignment Sheet 1)

16. Determine abdominal incisions required for various surgeries. (Assignment Sheet 2)

Introduction to Surgical Procedures
Unit 1

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Abdominal Incisions (Objective (5)
   TM 2—Layers of Abdominal Tissues (Objective 7)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the assignment sheets. Review criteria for evaluation of these activities.

Suggested Activities

Evaluation

12. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

13. Make copies of the written test. Add or modify test items as needed.

14. Give written test.

15. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

16. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Provide students with examples or copies of surgery schedules which illustrate the use of the suffixes outlined in Objective 1. Be certain to delete patient names. This will provide reinforcement of medical terminology, **communication skills, creative thinking skills,** and **problem-solving skills**.

2. Discuss the importance of teamwork and alertness in dealing with surgical complications. This will enhance **group effectiveness skills** and **communication skills**.

3. Review the layers of tissue and wound healing concepts. Refer to "Integumentary System" of MAVCC's *Anatomy and Physiology*. This will assist students in understanding and applying theory into practice concerning lasers and wound healing.

4. Discuss variations in the basic instrument setup for an exploratory laparotomy. You may wish to obtain an instrument list from several area hospitals and compare their content. Have students compare their experiences concerning different setup styles and selection of instruments. This activity will increase **teamwork skills, creative thinking skills, communication skills, reading skills, group effectiveness skills,** and possible **problem-solving skills**.

Suggested Activities

5. Divide the students into small groups and assign a surgical procedure to each group. Let the students decide who will be circulators and surgical technologists. Let them demonstrate the setup for the assigned surgical procedure. This activity will enhance **group effectiveness skills, teamwork skills, communication skills, problem-solving skills,** and **creative thinking skills**.

6. After completing Assignment Sheet 1, divide the students into small groups and assign each group an abdominal incision to present to the class. Have them include such things as:

   - Location of incision
   - Muscles and other structures that may be in the area
   - Possible problems that could be encountered
   - Instruments that may be used on the different tissues
   - Possible sutures used in closing the wound

   This activity will reinforce **teamwork, critical thinking skills, organizational skills, group effectiveness skills, communication skills,** and **problem-solving skills**.

7. The following suggested activity is designed to be an ongoing course or semester activity: Assign each student one surgical specialty area to research and make a classroom oral presentation about the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in that assigned surgical specialty area.

   Make sure students have access to adequate resources to prepare their reports. They will primarily need textbooks, surgical journals, and time to interview surgical team members working in their assigned surgical specialty area.

   Decide on and then provide students with copies of report guidelines they must follow. They should include the following, as well as others identified by you:

   a. Length of oral report (5-15 minutes?)
   b. Use of visual aids or handouts (size, type, required?)
   c. List of references (type, how many?)
   d. Written summary (type, required?)
   e. Grading criteria

      (1) Delivery — Voice control, eye contact, enthusiasm, appearance, etc.
      (2) Content — Subject covered new advancements, innovations. Interesting to audience; relevant to surgical technologists

   Research and oral presentations can reinforce **reading, writing,** and **science foundations skills; communication skills, creative and critical thinking skills, self-esteem,** and **organizational effectiveness skills**.

Suggested Activities

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. *AORN Standards and Recommended Practices for Perioperative Nursing.* Denver: Association of Operating Room Nurses, Inc., 1992.

3. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

4. Ball, Kay A. *Lasers: The Perioperative Challenge.* St. Louis: C. V. Mosby Co., 1990.

5. *Core Curriculum for Surgical Technology.* Littleton, CO: Association of Surgical Technologists, 1990.

6. Fuller, Joanna. *Surgical Technology: Principles and Practice.* Philadelphia: W. B. Saunders Co., 1986.

7. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

8. Phippen, Mark L. and Maryann Papanier Wells. *Perioperative Nursing Practice.* Philadelphia: W. B. Saunders Co., 1994.

9. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Supplemental Resources

1. *Advanced Training for Operating Room Clinical Specialties.* There are over 200 self-directed learning modules, each covering a surgical procedure. Available from:

   Medcom Inc.
   P.O. Box 3225
   Garden Grove, CA 92642-9892
   800-877-1443

Suggested Activities

2. Assorted videos on surgical procedures and related topics. Available from:

   American College of Surgeons
   Davis and Geck
   Surgical Video Library
   ACS/Davis and Geck
   1 Casper Street
   Danbury, CT 06810
   800-633-0004

3. J. B. Lippincott
   Video and Computer Software Programs
   P.O. Box 680
   Holmes, PA 19043
   800-523-2945

4. Videos on draping, infection control, internal stapling, orthopedic devices, and wound closure. Available from:

   3M Educational Materials
   800-328-4827 ext 1205

5. *The Hazards of Surgical Smoke*, videotape and workbook designed to protect the surgical team from the smoke generated during electrosurgery and laser procedures. Available from:

   Stackhouse Educational Services
   2059 Atlanta Avenue
   Riverside, CA 92507-9869
   800-325-0082

6. *Caring for the Patient Undergoing Laser Therapy*, 28-minute videotape that explains what lasers are, how they are used, different types of medical lasers, and necessary safety precautions. Available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL AJN

Suggested Activities

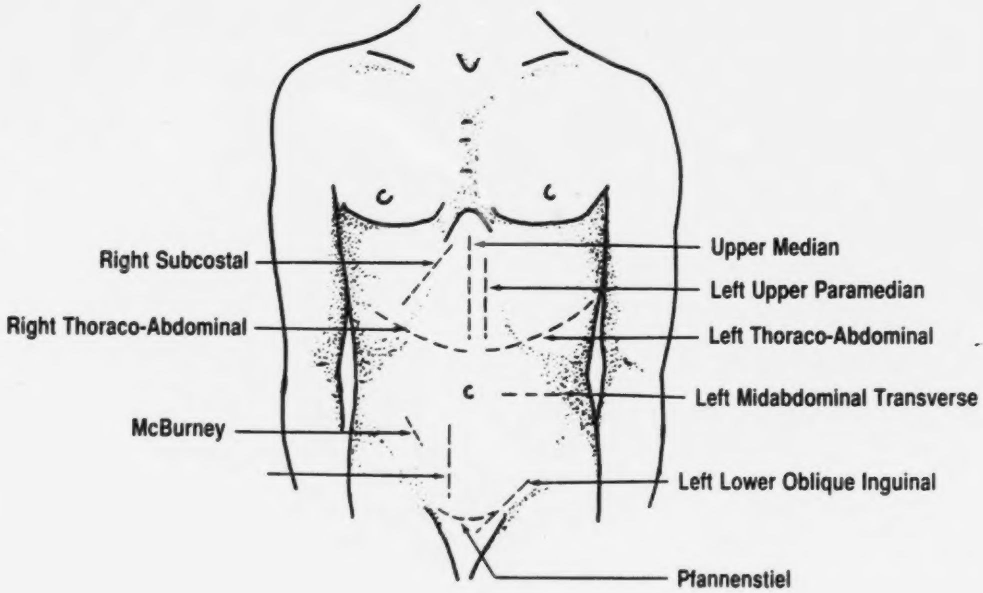
7. *Virtual Reality in Medicine*, 30-minute videotape that explores the new computer-generated world that mimics real life. Shows surgeons in training learning complicated procedures before ever working on a live patient, how plastic surgeons are reconstructing faces on a computer, and how drug designers are coming up with cancer medications. Available from:

   Films for the Humanities & Sciences
   P.O. Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

Introduction to Surgical Procedures
Unit 1

Answers to Assignment Sheets

Assignment Sheet 1


Right Subcostal
Right Thoraco-Abdominal
McBurney
Upper Median
Left Upper Paramedian
Left Thoraco-Abdominal
Left Midabdominal Transverse
Left Lower Oblique Inguinal
Pfannenstiel

Answers to Assignment Sheets

Assignment Sheet 2

1. Upper median, upper paramedian (right or left), thoraco-abdominal, or midabdominal transverse
2. McBurney
3. Right subcostal or right midabdominal transverse
4. Lower median, lower paramedian (right or left), or Pfannenstiel
5. Left upper paramedian or left subcostal
6. Upper median, right upper paramedian
7. Lower median or lower paramedian (right or left)
8. Pfannenstiel
9. Lower oblique inguinal
10. Lower median or lower paramedian (right or left)

Introduction to Surgical Procedures
Unit 1

Answers to Written Test

1. a. 2
   b. 3
   c. 1
   d. 6
   e. 9
   f. 7
   g. 4
   h. 10
   i. 5

2. To allow the patient to be able to return to his/her best possible state of physical and mental health

3. a. 2
   b. 3
   c. 1
   d. 4

4. Any four of the following:

   a. Infection
   b. Respiratory distress
   c. Cardiac arrest
   d. Hemorrhage
   e. Procedure or equipment mishaps

5. a. Right subcostal
   b. Right upper paramedian
   c. Right midabdominal transverse
   d. McBurney
   e. Lower median or midline
   f. Upper median or midline
   g. Left thoraco-abdominal
   h. Left lower paramedian
   i. Left lower oblique inguinal
   j. Pfannenstiel

6. Any one answer for each of the following:

   a. Appendix
   b. Gallbladder or biliary system
   c. Uterus, bladder, or lower intestine
   d. Stomach, duodenum, or pancreas
   e. Upper stomach or lower esophagus
   f. Uterus, ovaries, or uterine tubes

Answers to Written Test

g. Pelvic structures or proximal half of colon
h. Inguinal hernia repair
i. Spleen or stomach
j. Spleen

7. a. Peritoneum
   b. Muscle
   c. Fascia
   d. Subcutaneous
   e. Skin

8. a. Laparotomy — An incision made through the abdominal wall into the peritoneal cavity
   b. Exploratory laparotomy — An incision made through the abdominal wall into the peritoneal cavity as a diagnostic procedure, without knowing the exact nature of the patient's condition or disease

9. a. Any three of the following:

      (1) 3 Knife handles and blades, #3 with #10 blade, #4 with #20 blade, #7 with #15 blade
      (2) 1 Mayo scissors, 6¼″, straight
      (3) 1 Mayo scissors, 6¼″, curved
      (4) 1 Metzenbaum scissors, 7″
      (5) 1 Suture scissors

   b. Any five of the following:

      (1) 1 Tissue forcep without teeth, 5½″
      (2) 2 Tissue forceps with teeth, 5½″
      (3) 2 Tissue forceps without teeth, 7″ and 10″
      (4) 2 Tissue forceps with teeth, 7″ and 10″
      (5) 2 Adson forceps with teeth
      (6) 2 Sponge-holding forceps, 10″
      (7) 6 Towel clamps, 3½″ or 5½″
      (8) 8 Allis forceps, 6″ and 9″ (4 of each)
      (9) 4 Babcock intestinal forceps, 6″
      (10) 4 Rochester-Ochsner or Kocher forceps, straight, 6¼″
      (11) 4 Rochester-Ochsner or Kocher forceps, straight, 9″
      (12) 6 Needleholders, 6″, 8″, and 10″ (2 of each)

Answers to Written Test

c. Any four of the following:

(1) 12 Crile forceps, straight or curved, 5½″
(2) 6 Rochester-Pean forceps, curved, 6¼″
(3) 4 Rochester-Pean forceps, curved, 8″
(4) 2 Right angle forceps
(5) 2 Tonsil or Adson forceps

d. Any two of the following:

(1) 2 Malleable retractors, 1″ or 1½″ width
(2) 2 Army-Navy retractors
(3) 3 Richardson or Kelly retractors, small, medium, and large
(4) 3 Deaver retractors, small, medium, and large
(5) 1 Balfour retractor with blades (optional)

e. Either one of the following:

(1) 1 Poole suction tube and tubing
(2) 1 Yankauer suction tube and tubing
(3) 1 Electrosurgical unit and accessories

10. a. Any five of the following:

(1) Pull basic setup using surgeon's preference card, open sterile items, and prepare initial sterile field.
(2) Scrub, gown, and glove.
(3) Drape back table.
(4) Drape Mayo.
(5) Set up basic Mayo.
(6) Count sponges, needles, and instruments with circulator.
(7) Gown and glove the surgeon and assistant(s).
(8) Drape according to surgeon's preference for particular incision or with surgeon's assistance.
(9) Move Mayo stand up to the field below the wound site.
(10) Clamp electrosurgical and suction tubing to the top drape.
(11) Place laparotomy sponges on each side of the proposed incision site.

b. (1) Any one: Hemostats, free ties, or electrosurgical pencil or forceps
(2) Fascia — Any one: Pass scalpel and be prepared to pass retractors and replace lap sponges as needed.
(3) Muscle— Any one: Pass scalpel and prepare for entrance into peritoneum by dipping lap sponges in warm saline solution and wringing out, by having self-retaining retractor such as Balfour available, and by removing small radiopaque sponges from the field immediately.

Answers to Written Test

(4) Peritoneum — Any one: Pass hemostats, knife, and/or Metzenbaum scissors, and pass self-retaining retractor and saline-moistened sponges to protect tissue edges from retractor.

(5) Any four of the following:

  (a) Keep the field clear of instruments not in use.
  (b) Keep the electrosurgical pencil free of tissue debris.
  (c) Exchange soiled sponges for clean ones.
  (d) Keep loose items such as needles, small dissecting sponges, and suture wrappers off the Mayo stand.
  (e) Protect the field from contamination.
  (f) Anticipate the needs of the surgeon.
  (g) Notify the surgeon of a break in technique if one should occur.
  (h) Complete procedure as pathology indicates and care for specimen if needed.
  (i) Assist with irrigation according to surgeon's preference.
  (j) Count sponges, sharps, and instruments according to hospital policy.
  (k) Pass clamps, sutures, and retractors according to surgeon's preference and assist in cutting suture ties if needed.

c. Any two of the following:

  (1) Assist in removing excess blood around incision and place dressing over wound.
  (2) Remove drapes and covers on the light handles.
  (3) Assist in moving patient to post-anesthesia recovery cart.
  (4) Clean room.

11. a. Stimulated, Emission, Radiation
  b. Light, heat
  c. Any two of the following:

  (1) Improved hemostasis
  (2) Improved precision, especially when used with the microscope
  (3) Decreased postoperative edema, pain, and scarring
  (4) Decreased operative time
  (5) Avoidance of possible hospitalization
  (6) Uncomplicated wound healing

Answers to Written Test

12. a. Nd
    b. E
    c. KTP
    d. CO_2 or H
    e. A
    f. Kr
    g. Nd
    h. R

13. a. 4
    b. 5
    c. 1
    d. 2

14. a. Any two of the following:

    (1) Noncombustible anesthetic agents should be used.
    (2) Nonflammable antiseptic should be used for skin preparation.
    (3) Patient's eyes should be protected by a double layer of moistened eye pads for the CO_2 laser and by goggles, protective lenses, or metal shields for other lasers.
    (4) Patient's exposed skin and mucous membranes outside the surgical field should be protected by a double layer of moistened surgical towels.
    (5) When used, endotracheal tubes must be protected from direct and reflected laser beam irradiation to prevent catastrophic airway fires by wrapping the tubes with reflective metal (aluminum foil) tape and by placing water-saturated neurosurgical cottonoids below the vocal cords.

    b. Any two of the following:

    (1) All operating room personnel should wear protective glasses. Clear glass goggles will suffice with the CO_2 laser, while special colored lenses should be worn by all present for other lasers.
    (2) Protect skin.
    (3) Avoid inhalation of laser plume.

    c. Any two of the following:

    (1) Warning signs should be posted on all doors to control access.
    (2) Walls and ceilings should have non-reflective surfaces.
    (3) Any windows in the laser area must be covered while the laser is in use to prevent unprotected personnel from watching the procedure and possibly receiving reflected laser irradiation.
    (4) Warning labels must indicate points of danger to avoid personnel exposure to laser radiation.

Answers to Written Test

(5) Check machine for proper functioning. Any malfunction should prohibit use until repaired.
(6) Machine should be kept on "standby" setting when not in use during the surgical procedure.
(7) Monitor the laser foot switch.
(8) Use nonreflective instruments.
(9) A basin of sterile water should be available in case of fire.
(10) Electrical codes must be enforced.
(11) Follow manufacturers' instructions for operation, care, handling, and sterilization procedures.

Introduction to Surgical Procedures
Unit 1

Written Test

Name ______________________ Date ______________ Score ______

1. Match the suffixes relating to surgical procedures on the right with the correct definitions.

   ______a. Binding or fixation
   ______b. Excision; surgical removal
   ______c. To puncture in order to aspirate
   ______d. Creation of a new opening for drainage
   ______e. Repair or surgical reconstruction of
   ______f. Incision into
   ______g. Incision for removal of stones
   ______h. Suture or repair
   ______i. Inspection/examination through a lighted scope

   1. -centesis
   2. -desis
   3. -ectomy
   4. -lithotomy
   5. -oscopy
   6. -ostomy
   7. -otomy
   8. -pexy
   9. -plasty
   10. -rrhaphy

2. State the primary goal of surgical intervention.

   ____

3. Match reasons for surgical intervention on the right with the correct descriptions.

   ______a. To prevent the occurrence of a disease or illness
   ______b. To relieve or alleviate symptoms, without curing the underlying cause or disease
   ______c. To regain the patient's health and strength
   ______d. To investigate and identify the cause or nature of a condition, illness, or disease

   1. Restorative
   2. Prophylactic
   3. Palliative
   4. Diagnostic

Written Test

4. List four types of surgical complications.

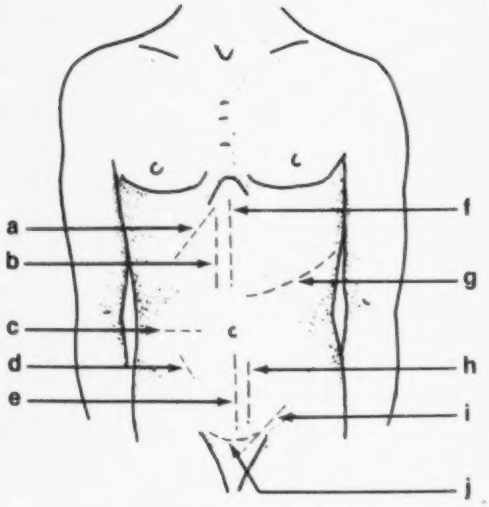
   a. ______________________________

   b. ______________________________

   c. ______________________________

   d. ______________________________

5. Identify the following common abdominal incisions, and place your answers in the blanks provided. Be sure to identify as right or left and/or upper or lower as needed.



a. ________________ f. ________________

b. ________________ g. ________________

c. ________________ h. ________________

d. ________________ i. ________________

e. ________________ j. ________________

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Written Test

6. List one common use for each of the following abdominal incisions.

   a. McBurney ____________________

   b. Right subcostal ____________________

   c. Lower median ____________________

   d. Right upper paramedian ____________________

   e. Thoraco-abdominal ____________________

   f. Pfannenstiel ____________________

   g. Right lower paramedian ____________________

   h. Left lower oblique ____________________

   i. Left upper paramedian ____________________

   j. Left subcostal ____________________

7. List in order the layers of abdominal tissues beginning with the innermost layer.

   a. ____________________

   b. ____________________

   c. ____________________

   d. ____________________

   e. ____________________

8. Define a laparotomy and an exploratory laparotomy.

   a. Laparotomy ____________________

   ____

   b. Exploratory laparotomy ____________________

   ____

   ____

Written Test

9. List basic instruments needed for an exploratory laparotomy according to the following categories, and list the approximate number of each that would be needed.

   a. Cutting instruments

      (1) ____________________

      (2) ____________________

      (3) ____________________

   b. Grasping/holding instruments

      (1) ____________________

      (2) ____________________

      (3) ____________________

      (4) ____________________

      (5) ____________________

   c. Clamping instruments

      (1) ____________________

      (2) ____________________

      (3) ____________________

      (4) ____________________

   d. Exposing instruments

      (1) ____________________

      (2) ____________________

   e. Accessory item ____________________

Written Test

10. Describe the duties of the surgical technologist in an exploratory laparotomy.

    a. Preoperative

        (1) ____________________

        (2) ____________________

        (3) ____________________

        (4) ____________________

        (5) ____________________

    b. Intraoperative

        (1) For skin and subcutaneous layer — Pass scalpel and be prepared to pass ____________________

        ____

        (2) For next layer which is the ____________________

        ____

        (3) For next layer which is the ____________________

        ____

        (4) For next layer which is the ____________________

        ____

        (5) Perform following duties as needed:

            (a) ____________________

            (b) ____________________

            (c) ____________________

            (d) ____________________

Written Test

c. Postoperative

(1) ______________________________

(2) ______________________________

11. Complete the following statements concerning the use of lasers in surgery by filling in the blanks with the correct answers.

a. Laser is an acronym for Light Amplification by ________________ ________________ of ________________.

b. Radiant energy (radiation) produces both ________________ and ________________.

c. Laser surgery offers several advantages. Name two.

(1) ______________________________

(2) ______________________________

12. Distinguish among the types of lasers by placing the following letters next to the correct descriptions.

- A — Argon
- CO_2 — Carbon dioxide
- E — Excimer
- H — Holmium:YAG
- Kr — Krypton
- KTP — Potassium titanyl phosphate
- Nd — Neodymium:YAG
- R — Ruby

______a. Is the most powerful coagulator of all surgical lasers capable of vaporizing large volumes of tissue

______b. Produces "cool" energy; emits a visible blue-green beam

______c. Operates in the visible spectrum emitting a green beam; strongly absorbed by hemoglobin and melanin

______d. Operates in the middle of the infrared portion of the spectrum emitting an invisible beam; absorbed by water

______e. Operates in the visible light region in the blue-green spectrum; absorbed by hemoglobin; used in ophthalmology, gynecology, and dermatology

______f. Operates in the visible light spectrum emitting a red-yellow light beam; resembles the argon laser in construction and use

Written Test

______g. Operates in the near (low) infrared spectrum emitting an invisible beam; poorly absorbed by hemoglobin and water; intensely absorbed by tissue protein; penetration into tissue is very deep

______h. Emits a visible red light; primarily used in dermatology to remove port-wine stains

13. Match laser system parts on the right with their correct descriptions.

______a. Provides energy to the laser head to produce laser light

______b. Contains the active medium to energize and produce the laser energy

______c. Additional laser parts required to produce laser energy; includes console and cooling systems

______d. Source of laser operation controlling the wattage and duration

1. Ancillary component
2. Control panel
3. Delivery system
4. Excitation source
5. Laser head

14. Discuss at least two precautions for using lasers in the following areas:

a. Patient safety precautions

(1) ______________________________

(2) ______________________________

b. Personnel safety precautions

(1) ______________________________

(2) ______________________________

c. Environmental safety precautions

(1) ______________________________

(2) ______________________________

*Permission to duplicate this test is granted.

Introduction to Surgical Procedures
Unit 1

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Draw and Label Common Abdominal Incisions Rating _____

Comments: ____

____

Assignment Sheet 2—Determine Abdominal Incisions Required for Various Surgeries Rating _____

Comments: ____

____

Written Test Scores

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

***Permission to duplicate this form is granted.**

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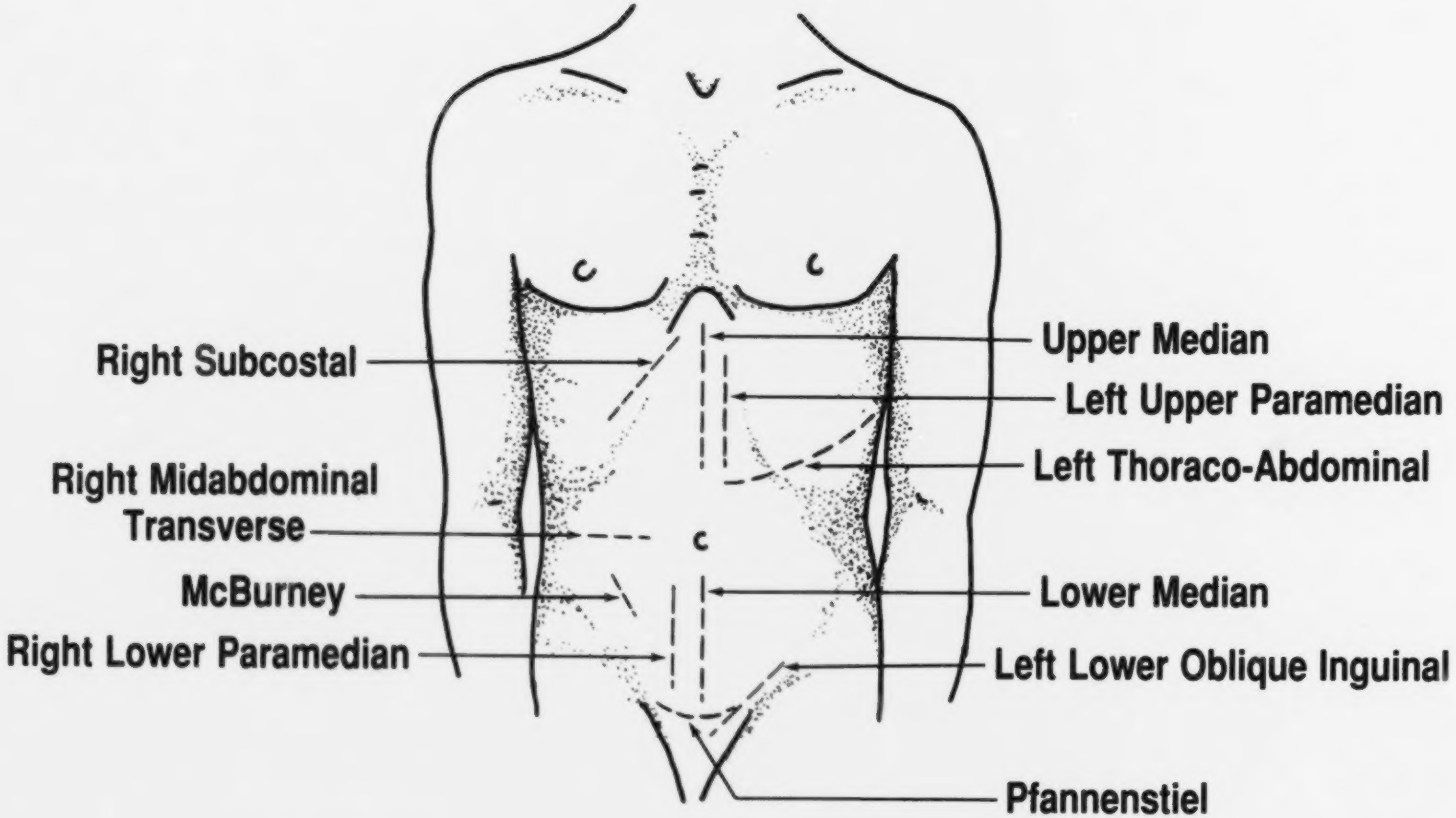
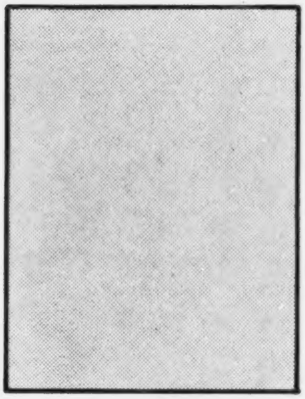
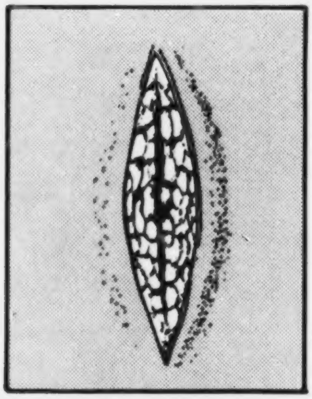
Abdominal Incisions


Right Subcostal
Right Midabdominal Transverse
McBurney
Right Lower Paramedian
Upper Median
Left Upper Paramedian
Left Thoraco-Abdominal
Lower Median
Left Lower Oblique Inguinal
Pfannenstiel

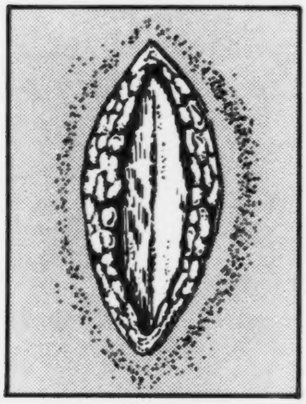
Layers of Abdominal Tissues



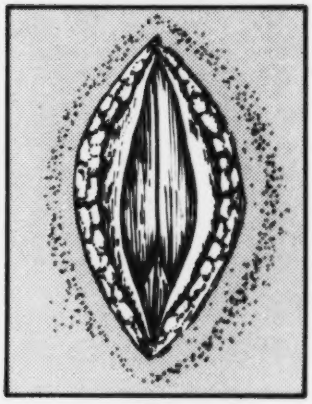
a. Skin



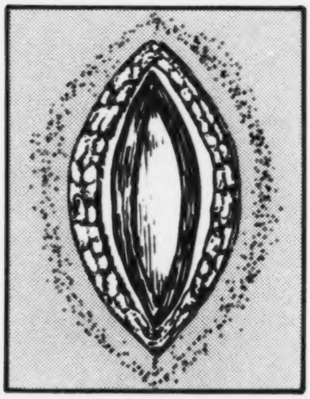
b. Subcutaneous



c. Fascia



d. Muscle



e. Peritoneum

Introduction to Surgical Procedures
Unit 1

Information Sheet

1. **Suffixes relating to surgical procedures and their definitions**

   a. **-centesis** — To puncture in order to aspirate

   b. **-desis** — Binding or fixation

   c. **-ectomy** — Excision; surgical removal

   d. **-lithotomy** — Incision for removal of stones

   e. **-oscopy** — Inspection/examination through a lighted scope

   f. **-ostomy** — Creation of a new opening for drainage

   g. **-otomy** — Incision into

   h. **-pexy** — Suspension or fixation

   i. **-plasty** — Repair or surgical reconstruction of

   j. **-rrhaphy** — Suture or repair

2. **Primary goal of surgical intervention** — To allow the patient to be able to return to his/her best possible state of physical and mental health

   Note: It is recognized that not every patient will return to a state of wellness due to the nature of some terminal illnesses. In these cases, the health team members will work together to ease the patient's pain and discomfort.

3. **Reasons for surgical intervention**

   a. **Prophylactic (preventive)** — To prevent the occurrence of a disease or illness

   b. **Restorative (curative)** — To regain the patient's health and strength

   c. **Palliative** — To relieve or alleviate symptoms, without curing the underlying cause or disease

   d. **Diagnostic** — To investigate and identify the cause or nature of a condition, illness, or disease

Information Sheet

4. **Types of surgical complications**
    a. Infection
    b. Respiratory distress
    c. Cardiac arrest
    d. Hemorrhage
    e. Procedure or equipment mishaps

    Examples: Incorrect sponge count, malfunctioning equipment

5. **Common abdominal incisions** (Figure (1))
    a. **Vertical**
        (1) Median or midline

        Note: This is the simplest abdominal incision. It provides excellent abdominal exposure and is easily extended.

            (a) Upper
            (b) Lower

        (2) Paramedian rectus — Parallel and approximately 4 cm lateral to the midline
            (a) Right or left upper
            (b) Right or left lower

    b. **Oblique**
        (1) McBurney, muscle-splitting (right)
        (2) Subcostal (Kocher)
            (a) Right
            (b) Left
        (3) Lower oblique inguinal
            (a) Right
            (b) Left

Information Sheet

(4) Thoraco-abdominal

(a) Right

(b) Left

Note: For this incision the patient is in the lateral position. It extends from a point between the xiphoid and umbilicus across the abdomen to the seventh or eighth intercostal space and into the thorax.

c. **Transverse**

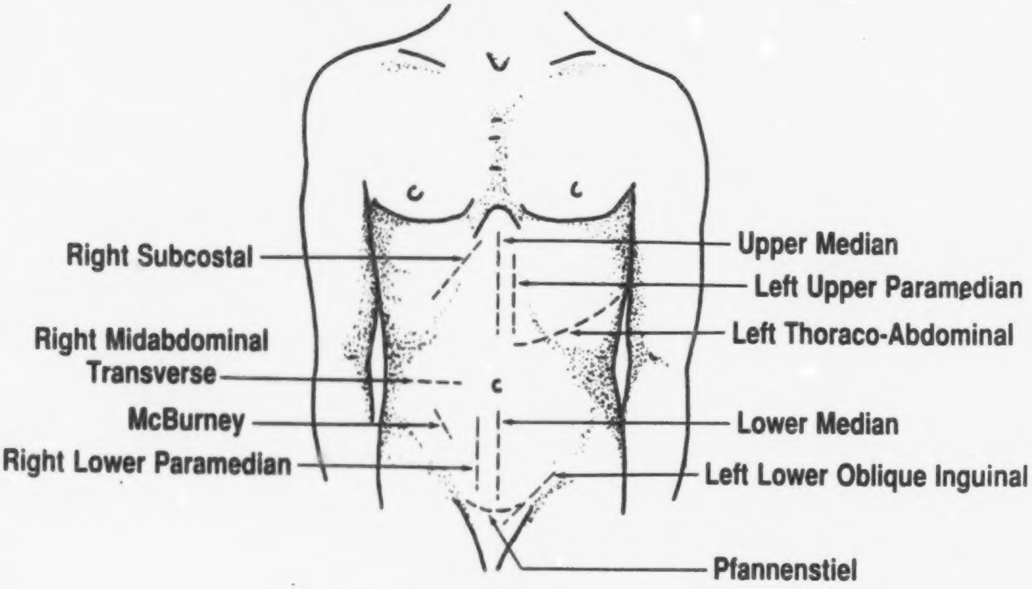
(1) Midabdominal

(a) Right

(b) Left

(2) Pfannenstiel

Figure 1—Abdominal incisions


Right Subcostal
Upper Median
Left Upper Paramedian
Left Thoraco-Abdominal
Right Midabdominal Transverse
McBurney
Lower Median
Right Lower Paramedian
Left Lower Oblique Inguinal
Pfannenstiel

Information Sheet

6. **Abdominal incisions and their common uses**

   a. Upper median — Stomach, duodenum, pancreas

   b. Lower median — Uterus, bladder, lower intestine

   c. Right upper paramedian — Stomach, duodenum, pancreas

   d. Left upper paramedian — Spleen, stomach

   e. Right lower paramedian — Pelvic structures, proximal half of colon

   f. Left lower paramedian — Pelvic structures, distal half of colon

   g. McBurney — Appendix

   h. Right subcostal — Gallbladder, biliary system

   i. Left subcostal — Spleen

   j. Lower oblique inguinal (left or right) — Inguinal hernia repair

   k. Thoraco-abdominal (left or right) — Upper stomach, lower esophagus

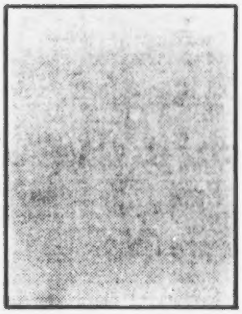
   l. Midabdominal transverse (left or right) — Stomach, pancreas, biliary system

   m. Pfannenstiel — Uterus, ovaries, uterine (fallopian) tubes

7. **Layers of abdominal tissues** (listed from outside surface inward)

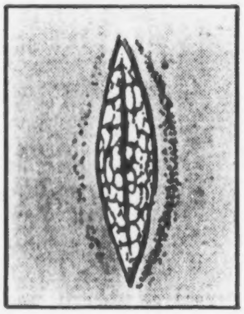
   a. Skin

   Figure 2



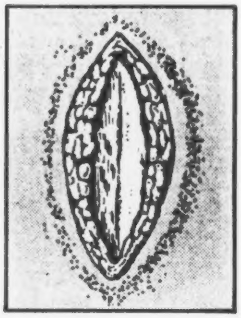
   b. Subcutaneous

   Figure 3



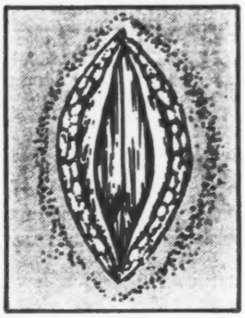
   c. Fascia

   Figure 4



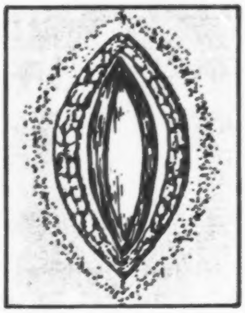
d. Muscle

Figure 5



e. Peritoneum

Figure 6



8. **Definitions of laparotomy and exploratory laparotomy**

   a. **Laparotomy** — An incision made through the abdominal wall into the peritoneal cavity

   b. **Exploratory laparotomy** — An incision made through the abdominal wall into the peritoneal cavity as a diagnostic procedure, without knowing the exact nature of the patient's condition or disease

9. **Basic instruments needed for an exploratory laparotomy**

   Note: This varies according to institution and surgeon.

   a. Cutting instruments

      - 3 Knife handles and blades, #3 with #10 blade, #4 with #20 blade, #7 with #15 blade
      - 1 Mayo scissors, 6¼″, straight
      - 1 Mayo scissors, 6¼″, curved
      - 1 Metzenbaum scissors, 7″
      - 1 Suture scissors

Information Sheet

b. Grasping/holding instruments

- 1 Tissue forcep without teeth, 5½″
- 2 Tissue forceps with teeth, 5½″
- 2 Tissue forceps without teeth, 7″ and 10″
- 2 Tissue forceps with teeth, 7″ and 10″
- 2 Adson forceps with teeth
- 2 Sponge-holding forceps, 10″
- 6 Towel clamps, 3½″ or 5½″
- 8 Allis forceps, 6″ and 9″ (4 of each)
- 4 Babcock intestinal forceps, 6″
- 4 Rochester-Ochsner or Kocher forceps, straight, 6¼″
- 4 Rochester-Ochsner or Kocher forceps, straight, 9″
- 6 Needleholders, 6″, 8″, and 10″ (2 of each)

c. Clamping instruments

- 12 Crile forceps, straight or curved, 5½″
- 6 Rochester-Pean forceps, curved, 6¼″
- 4 Rochester-Pean forceps, curved, 8″
- 2 Right angle forceps
- 2 Tonsil or Adson forceps

d. Exposing instruments

- 2 Malleable retractors, 1″ or 1½″ width
- 2 Army-Navy retractors
- 3 Richardson or Kelly retractors, small, medium, and large
- 3 Deaver retractors, small, medium, and large
- 1 Balfour retractor with blades (optional)

Information Sheet

e. Accessory items

- 1 Poole suction tube and tubing
- 1 Yankauer suction tube and tubing
- 1 Electrosurgical unit and accessories

10. Duties of the surgical technologist in an exploratory laparotomy

Note: This procedure may vary according to institution and surgeon.

a. Preoperative

(1) Pull basic setup using surgeon's preference card, open sterile items, and prepare initial sterile field.

(2) Scrub, gown, and glove.

(3) Drape back table.

(4) Drape Mayo.

(5) Set up basic Mayo.

(6) Count sponges, needles, and instruments with circulator (first count).

(7) Gown and glove the surgeon and assistant(s).

Note: Circulator positions and preps the patient prior to the draping.

(8) Drape according to surgeon's preference for particular incision or with surgeon's assistance.

(9) Move Mayo stand up to the field below the wound site.

(10) Clamp electrosurgical and suction tubing to the top drape.

(11) Place laparotomy sponges on each side of the proposed incision site.

b. Intraoperative

(1) Skin and subcutaneous — Pass scalpel and be prepared to pass hemostats, free ties, or electrosurgical pencil or forceps.

Information Sheet

(2) Fascia — Pass scalpel and be prepared to pass retractors and replace lap sponges as needed.

Note: The surgeon may wish to lengthen the fascial incision with the electrosurgical pencil or may use curved Mayo scissors. Be prepared to pass what is needed.

(3) Muscle — Pass scalpel and prepare for entrance into peritoneum.

(a) Dip lap sponges in warm saline solution and wring out.

(b) Have self-retaining retractor such as Balfour available.

(c) Remove small radiopaque sponges from the field immediately.

(4) Peritoneum

(a) Pass hemostats, knife, and/or Metzenbaum scissors. (The peritoneum is now open.)

(b) Pass self-retaining retractor and saline-moistened sponges to protect tissue edges from retractor.

(5) Perform following duties as needed:

(a) Keep the field clear of instruments not in use.

(b) Keep the electrosurgical pencil free of tissue debris.

(c) Exchange soiled sponges for clean ones.

(d) Keep loose items such as needles, small dissecting sponges, and suture wrappers off the Mayo stand.

Note: Needles and small sponges go on the field or Mayo tray *only* when mounted on the appropriate instrument.

(e) Protect the field from contamination.

(f) Anticipate the needs of the surgeon.

(g) Notify the surgeon of a break in technique if one should occur.

Information Sheet

(h) Complete procedure as pathology indicates and care for specimen if needed.

Examples: Appendectomy, intestinal obstruction, ectopic pregnancy, adhesions

(i) Assist with irrigation according to surgeon's preference.

(j) Count sponges, sharps, and instruments according to hospital policy.

(k) Pass clamps, sutures, and retractors according to surgeon's preference and assist in cutting suture ties if needed.

c. Postoperative

(1) Assist in removing excess blood around incision and place dressing over wound.

(2) Remove drapes and covers on the light handles.

Note: After removing the drapes, you may need to remove solutions, tissue debris, and blood from peripheral areas of patient's body.

(3) Assist in moving patient to post-anesthesia recovery cart.

(4) Clean room.

Note: Discard sharps according to hospital policy and care for instruments appropriately.

11. The use of lasers in surgery

a. Laser is an acronym for Light Amplification by Stimulated Emission of Radiation.

b. Lasers are devices that use the natural oscillations of atoms or molecules between energy levels for generating coherent electromagnetic radiation.

c. Radiant energy (radiation) produces both light and heat.

(1) Laser light may be in the ultraviolet, visible, or infrared regions of the light spectrum.

(2) Laser heat can be useful in surgical applications for cutting, coagulating, and vaporizing tissue.

Information Sheet

d. Surgical lasers are delicate and expensive and must be handled with great care.

e. Special safety precautions must be followed when lasers are being used.

f. Laser surgery offers several advantages:

   (1) Improved hemostasis

   (2) Improved precision, especially when coupled to the operating microscope

   (3) Decreased postoperative edema, pain, and scarring

   (4) Decreased operative time

   (5) Avoidance of possible hospitalization

   (6) Uncomplicated wound healing

12. Types of lasers

Note: Lasers are named by the medium in the laser cavity.

a. **Argon** (active medium: Argon ion gas)

   (1) Operates in the visible light region in the blue-green spectrum

   (2) Is easily delivered to the tissue through flexible fiberoptics and can be coupled to the operating microscope, hand probe, or through a variety of endoscopes

   (3) Argon laser energy is primarily absorbed in tissue by hemoglobin and melanin.

   (4) Used primarily to destroy skin lesions with minimal scarring, treat vascular lesions, coagulate superficial vessels in the G.I. tract, and to treat retinal detachments and hemorrhages

   (5) Used in ophthalmology, otolaryngology, gynecology, urology, neurology, and dermatology

b. **CO_2** (active medium: CO_2, nitrogen, and helium gases)

   (1) Operates in the middle of the infrared portion of the spectrum emitting an invisible beam

   (2) CO_2 lasers use a red **aiming** beam to focus on the tissue to be irradiated.

Information Sheet

(3) Is delivered to the tissue coupled to the operating microscope or with the aid of articulating mirrors and hand probes

(4) CO_2 laser emissions are heavily absorbed by water.

(5) The vaporization and hemostatic action of the CO_2 laser is valuable in treating soft tissue and vascular lesions.

(6) Primarily used in otolaryngology, gynecology, plastic surgery, dermatology, neurosurgery, orthopedics, and cardiovascular and general surgery

c. **Krypton** (active medium: Krypton ion gas)

(1) Operates in the visible light spectrum emitting a red-yellow light beam.

(2) Absorbed by pigment found in blood and retinal epithelium

(3) Resembles the argon laser in construction and use

(4) Delivered through fiberoptics, microscopes, handpieces, and endoscopes

(5) Primarily used in ophthalmology

d. **Nd:YAG** (yttrium-aluminum-garnet doped with 1%-3% of neodymium [Nd] ions)

(1) Operates in the near (low) infrared spectrum emitting an invisible beam

(2) Is delivered to the tissue by flexible fiberoptics, and is either coupled to a hand probe for focusing or is used alone with an endoscope

(3) Its penetration into tissue is very deep. It is the most powerful coagulator of all surgical lasers capable of vaporizing large volumes of tissue.

(4) It is poorly absorbed by hemoglobin and water but intensely absorbed by tissue protein.

(5) Has applications in neurosurgery, urology, rhinolaryngology, gynecology, general surgery, orthopedics, and thoracic surgical procedures

e. **KTP** (active medium: Potassium titanyl phosphate)

Note: This is sometimes known as Frequency Doubled YAG.

(1) Operates in the visible spectrum emitting a green beam

(2) Is delivered to the tissue through a microscope or a flexible fiber

Information Sheet

(3) Produces less power than CO_2 or Nd:YAG laser but can be focused to a smaller diameter

(4) Strongly absorbed by hemoglobin, melanin, and similar pigments and is transmitted through clear fluids

(5) Can adapt to any surgical specialty using the wide variety of accessories

f. **Holmium: YAG** (active medium: Holmium, thulium, and chromium)

(1) Operates in the mid-infrared (orange) portion of the spectrum emitting an invisible beam

(2) Delivered to the tissue through a flexible fiber

(3) Penetrates less deeply into tissue than Nd:YAG with greater precision in cutting and less heating of tissue

(4) Absorbed by tissues containing water

(5) Used primarily for orthopedic, neurology, and general surgical procedures

g. **Ruby** (active medium: Ruby crystal)

(1) Emits a visible red light

(2) Delivered to the tissue by a fiber or through a microscope

(3) Blood vessels and transparent substances do not absorb this beam

(4) Is capable of generating large amounts of energy on impact which can injure internal tissues and bone

(5) Used originally in ophthalmology but now primarily used in dermatology to remove port-wine stains (type of large birthmark)

h. **Excimer** (active medium: Halide, argon, fluoride)

(1) Emits a visible blue-green beam

(2) Produces "cool" energy

(3) Offers precision in cutting and coagulation without thermal damage to surrounding tissue

(4) Currently being developed for use in ophthalmology, peripheral and coronary angioplasty, neurosurgery, and orthopedics

Information Sheet

13. **Laser system parts**

    a. **Excitation source** — Provides energy to the laser head to produce laser light

    b. **Laser head** — Contains the active medium to energize and produce the laser energy

       Example: Argon laser energy is produced from argon gas.

    c. **Ancillary components** — Additional laser parts required to produce laser energy

       (1) Console — Protective housing for laser components

       (2) Cooling systems — Keep the laser head from overheating

    d. **Control panel** — Source of laser operation controlling the wattage and duration

    e. **Delivery system** — Attachment that transmits the laser energy to the tissue from the laser head

14. **Precautions for using lasers**

    a. **Patient safety precautions**

       (1) Noncombustible anesthetic agents should be used.

       (2) Nonflammable antiseptic should be used for skin preparation.

       (3) Patient's eyes should be protected by a double layer of moistened eye pads for the CO_2 laser and by goggles, protective lenses, or metal shields for other lasers.

       (4) Patient's exposed skin and mucous membranes outside the surgical field should be protected by a double layer of moistened surgical towels.

       (5) When used, endotracheal tubes must be protected from direct and reflected laser beam irradiation to prevent catastrophic airway fires by wrapping the tubes with reflective metal (aluminum foil) tape and by placing water-saturated neurosurgical cottonoids below the vocal cords.

       Note: Red rubber tubes offer less hazard than disposable polyvinylchloride (PVC) tubes.

Information Sheet

b. **Personnel safety precautions**

(1) All operating room personnel should wear protective glasses. Clear glass goggles will suffice with the CO_2 laser, while special colored lenses should be worn by all present for other lasers.

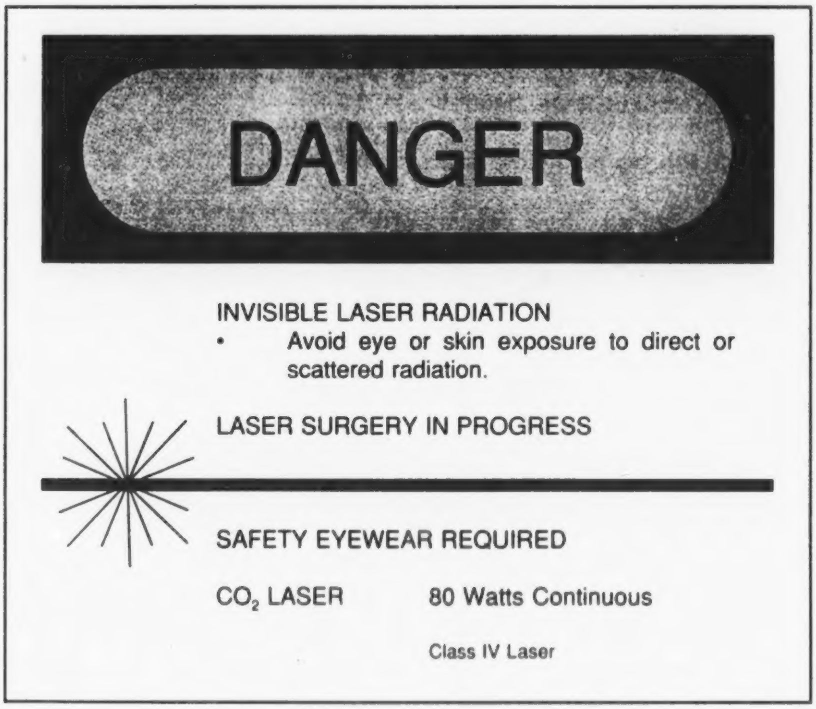
(2) Protect skin.

(3) Avoid inhalation of laser plume.

c. **Environmental safety precautions**

(1) Warning signs should be posted on all doors to control access.

Figure 7—Laser warning sign



DANGER

INVISIBLE LASER RADIATION

- Avoid eye or skin exposure to direct or scattered radiation.

LASER SURGERY IN PROGRESS

SAFETY EYEWEAR REQUIRED

CO_2 LASER 80 Watts Continuous

Class IV Laser

Information Sheet

(2) Walls and ceilings should have non-reflective surfaces.

(3) Any windows in the laser area must be covered while the laser is in use to prevent unprotected personnel from watching the procedure and possibly receiving reflected laser irradiation.

(4) Warning labels must indicate points of danger to avoid personnel exposure to laser radiation.

(5) Check machine for proper functioning. Any malfunction should prohibit use until repaired.

(6) Machine should be kept on "standby" setting when not in use during the surgical procedure.

(7) Monitor the laser foot switch.

(8) Use nonreflective instruments.

(9) A basin of sterile water should be available in case of fire.

(10) Electrical codes must be enforced.

(11) Follow manufacturers' instructions for operation, care, handling, and sterilization procedures.

Introduction to Surgical Procedures
Unit 1

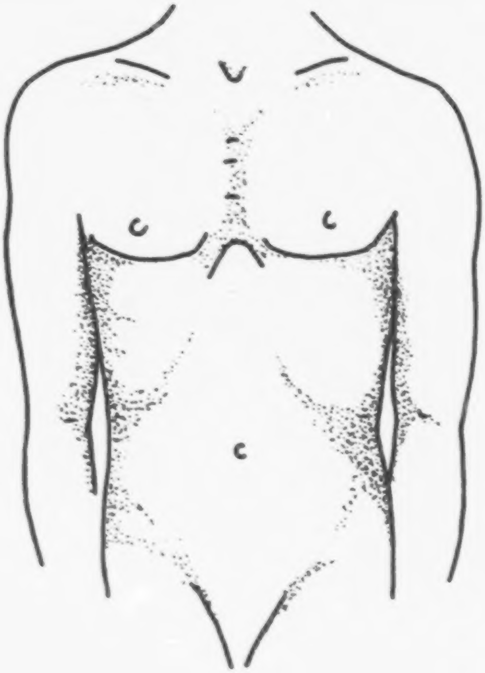
Assignment Sheet 1—Draw and Label Common Abdominal Incisions

Name ______________________________ Overall Rating ____________

Evaluation criterion	**Rating**
Locations of incisions drawn correctly	______

Directions: Draw and label the following abdominal incisions on the diagram provided. Label right or left and/or upper or lower as needed.

1. Upper median
2. McBurney
3. Right lower paramedian
4. Left thoraco-abdominal
5. Left lower oblique inguinal
6. Right subcostal
7. Left midabdominal transverse
8. Pfannenstiel
9. Left upper paramedian
10. Right thoraco-abdominal



Introduction to Surgical Procedures
Unit 1

Assignment Sheet 2—Determine Abdominal Incisions Required for Various Surgeries

Name ______________________________ Overall Rating ____________

Evaluation criterion	**Rating**
Appropriate incisions selected	______

Directions: State which abdominal incision(s) would most likely be used for surgery on the following anatomical structures:

1. Stomach ______________________________
2. Appendix ______________________________
3. Biliary system ______________________________
4. Uterus ______________________________
5. Spleen ______________________________
6. Pancreas ______________________________
7. Colon ______________________________
8. Uterine tubes ______________________________
9. Inguinal hernia ______________________________
10. Bladder ______________________________

Diagnostic Procedures
Unit 2

Objective Sheet

Unit Objective

After completing this unit, the student should be able to distinguish among basic diagnostic procedures and list diagnostic procedures used in various surgical specialties. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to diagnostic procedures with their correct definitions.
2. Match common methods of diagnosis with the correct descriptions.
3. Match radiology equipment used in diagnostic procedures with the correct descriptions.
4. Complete statements concerning characteristics of computed tomography scans.
5. Match basic pathology diagnostic procedures with the correct descriptions.
6. Match types of endoscopes with the correct uses.
7. Select true statements concerning characteristics of ultrasonography.
8. Complete statements concerning characteristics of magnetic resonance imaging.
9. List diagnostic procedures performed in surgical specialties.
10. Select true statements concerning common features of angiographic procedures.
11. Select true statements concerning percutaneous transluminal coronary angioplasty.
12. Sequence the steps for a pacemaker insertion.
13. Distinguish among diagnostic procedures. (Assignment Sheet 1)

Diagnostic Procedures
Unit 2

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.
2. Review Teaching Suggestions section that follows. Plan for classroom activities.
3. Plan for students with special needs.
4. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.
5. Develop teaching plan. Adjust for different learning styles.
6. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

7. Provide students with unit of instruction.
8. Discuss unit and specific objectives.
9. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.
10. Discuss the student supplement. This could be used as a homework assignment, practice exercise, or quiz. Explain to students how you plan to evaluate the supplement, if at all.
11. Discuss assignment sheet. Review criteria for evaluation of this activity.

Evaluation

12. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.
13. Make copies of the written test. Add or modify test items as needed.

Suggested Activities

14. Give written test.

15. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

16. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Acquaint students with a local medical center's radiology department. By providing a tour and observation day in Radiology, students can learn the diagnostic procedures performed in this area. This experience will enhance **communication skills, creative thinking skills, teamwork**, and **group effectiveness skills**.

2. Take the students for an observation day through a local medical center's pathology department (lab). Students can learn the diagnostic procedures performed on specimens and tissues sent for frozen sections and permanent specimens. This experience will enhance **communication skills, creative thinking skills, teamwork**, and **group effectiveness skills**.

3. Take the students for an observation day through the endoscopy lab. The students can learn the diagnostic procedures performed in this area to enhance **communication skills, critical thinking skills, teamwork**, and **group effectiveness skills**.

4. Include a day of observation in the Heart Cath Lab. The students can learn the diagnostic procedures performed in this area to enhance **critical thinking skills, communication skills, teamwork**, and **group effectiveness skills**.

5. Invite a Radiologist to speak to the class about new technology in diagnostic procedures performed in radiology. Have the students prepare questions beforehand to ask the guest speaker. Preparing and asking questions helps to reinforce their **writing foundation skills, creative thinking skills, communication skills**, and **self esteem**.

Suggested Activities

6. Invite a Pathologist to speak to the class about new technology in diagnostic procedures performed in pathology. Have the students prepare questions beforehand to ask the guest speaker. Preparing and asking questions helps to reinforce their **writing skills, creative thinking skills, communication skills**, and **self esteem**.

7. Have students research professional journals and articles to discover new diagnostic procedures performed in other areas of the country or world. Divide the class into small groups and have each group present their information. This activity will encourage **group effectiveness, teamwork, reading skills, writing skills, communication skills, organizational skills**, and **creative thinking skills**.

8. Have assigned students give oral reports on their research about diagnostic procedures. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in diagnostic procedures. This will reinforce **foundation skills, communication skills, personal management skills**, and **influence skills**.

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

9. Show videos of diagnostic procedures. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. These can reinforce **communication skills**.

Resources Used in Developing This Unit

1. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

2. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1994.

3. Pratt, Paulette and Ellen Sarewitz. *Surgery on File*. New York: Facts on File Inc., 1988.

4. Rothrock, Jane C. and Margaret Huth Meeker. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: C. V. Mosby Co., 1991.

Suggested Activities

Suggested Supplemental Resources

Note: In order to keep current with new technological developments related to diagnostic procedures, it is suggested that teachers begin files on new developments to supplement this unit. Recommended professional magazines include *Surgical Technologist, Jamma*, and the *AORN Journal.*

1. *MRI: Magnetic Resonance Imaging*, 7-minute videotape that explains and illustrates what happens during MRI.

2. *Angioplasty: An Available Alternative*, 10-minute videotape that explains the technique as well as cardiac catheterization.

3. *Coronary Angiography and P.T.C.A.*, 14-minute videotape that shows cardiac catheterization and percutaneous transluminal coronary angioplasty.

4. *Transesophagel Echocardiography*, 8-minute videotape that describes this new cardiac diagnostic test.

   1 - 4 are available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL AJN

5. *MRI: Exploring a New World*, 6 1/2 -minute videotape that explains this procedure in very simple terms.

6. *Gastrointestinal Diagnostic Tests: Upper GI X-ray Series and Gastroscopy*, 12-minute videotape

7. *Gastrointestinal Diagnostic Tests: Lower GI X-ray Series and Colonoscopy*, 12-minute videotape

8. *Gastrointestinal Diagnostic Tests: Ultrasound and CT Scan*, 11-minute videotape

Suggested Activities

9. *Gastrointestinal Diagnostic Tests: ERCP*, 8-minute videotape

   5 - 9 are available from:

   Medcom/Trainex
   P.O. Box 3225
   Garden Grove, CA 92641
   800-877-1443

10. *Space-Age Diagnosis*, 19-minute videotape that highlights three of the newest imaging devices—MRI, PIXAR, and positron emission tomography (PET), and explains the uses and advantages of each.

11. *Windows on the Body*, 26-minute videotape that examines CT scans, nuclear scans, ultrasound, PET, and MRI. Also examines the future and the issue of cost versus benefit.

12. *The Medical Applications of Ultrasound*, 19-minute videotape that looks at the benefits and risks of ultrasound technology in medicine.

13. *Crystals, Lasers, and the Human Body*, 58-minute videotape that highlights the importance of crystals and lasers in understanding and treating many diseases. Also looks at new insights possible with lasers.

    10 - 13 are available from:

    Films for the Humanities & Sciences
    P.O. Box 2053
    Princeton, NJ 08543-2053
    800-257-5126 or 609-452-1128

14. *Diagnostic Radiology*, 22-minute videotape that describes diagnostic tests such as gallbladder, upper G.I., colon, intravenous pyelogram, and mammography.

15. *Nuclear Medicine*, 26-minute videotape that describes the six most widely used tests—the brain scan, bone scan, thyroid scan, liver scan, lung scan, and cardiac imaging.

Suggested Activities

16. *Ultrasound/C.T. Scanner*, 15-minute videotape that presents these two advances in radiology.

    14 - 16 are available from:

    Fairview Audio-Visuals
    17909 Groveland Avenue
    Cleveland, OH 44111
    216-476-7054

17. *MRI*, 11-minute videotape that explains how magnetic fields and radio waves are used to display images of internal tissues and organs.

18. *CT Scan*, 10-minute videotape that examines how this technology works and what CT scans show.

19. *Bronchoscopy*, 10-minute videotape that reviews the advantages of bronchoscopy over invasive techniques such as surgery. Also describes how it is used to obtain tissue specimens.

20. *Computer Imaging in Radiology*, 30-minute videotape that differentiates among Computer Tomography Scanning, Digital Subtraction, Nuclear Medicine, Radiation Therapy, Sonography, and "Filmless Radiology."

    17 - 20 are available from:

    Insight Media
    121 West 85th Street
    New York, NY 10024
    800-233-9910 or 212-721-6316

Diagnostic Procedures
Unit 2

Answers to Student Supplement 1

1. Cystoscope — Used for visualization of the urinary bladder
2. Esophagogastroduodenoscope — Used for direct visualization of the esophagus, stomach, and duodenum
3. Mediastinoscope — Used for visualization of lymph nodes or tumors in the superior mediastinum
4. Colonoscope — Used for direct visualization of the entire large intestine
5. Proctoscope — Used for direct visualization of the rectum
6. Bronchoscope — Used for direct visualization of the bronchus, its branches, and the mucosa of the trachea
7. Sigmoidoscope — Used for direct visualization of the sigmoid colon
8. Nephroscope — Used for visualization of renal pelvis, calyces, and upper ureter
9. Esophagoscope — Used for direct visualization of esophagus and cardia of the stomach
10. Gastroscope — Used for direct visualization of the stomach
11. Laryngoscope — Used for direct visualization of the interior of the larynx
12. Arthroscope — Used for visualization of intra-articular surfaces; generally the knee
13. Laparoscope — Used for visualization of the peritoneal cavity through the anterior abdominal wall
14. Choledochoscope — Used for visualization of the common bile duct
15. Culdoscope — Used for visualization of pelvic structures; scope is introduced through small incision in posterior vaginal cul-de-sac

Diagnostic Procedures
Unit 2

Answers to Assignment Sheet 1

1. M
2. M
3. U
4. C
5. M
6. C
7. C (or U)
8. U
9. M (or C)
10. U

Diagnostic Procedures
Unit 2

Answers to Written Test

1. a. 12
   b. 2
   c. 15
   d. 3
   e. 10
   f. 4
   g. 1
   h. 16
   i. 11
   j. 7

2. a. 2
   b. 6
   c. 5
   d. 4
   e. 1

3. a. 4
   b. 3
   c. 1
   d. 5

4. a. An x-ray
   b. Transverse
   c. 180
   d. Density
   e. Ionizing radiation
   f. Radiologist

5. a. 4
   b. 2
   c. 3
   d. 1

6. a. 6
   b. 10
   c. 9
   d. 14
   e. 2
   f. 11
   g. 8
   h. 3
   i. 1
   j. 4
   k. 5
   l. 13

7. a. F
   b. T
   c. F
   d. F

Answers to Written Test

8. a. Electromagnetic
   b. Any one of the following:

      (1) Detection of tumors
      (2) Detection of inflammatory diseases
      (3) Detection of infections and abscesses
      (4) Evaluation of functions of cardiovascular and central nervous systems

   c. Any one: Pacemakers or ferromagnetic implants
   d. Electromagnet
   e. Immobile (still)

9. a. Any three of the following:

      (1) Biopsies
      (2) Endoscopic evaluations
      (3) Needle aspiration
      (4) Ultrasound
      (5) Cholangiograms
      (6) CT scans
      (7) MRI scans

   b. Any three of the following:

      (1) Endoscopic evaluations
      (2) Biopsies
      (3) G.I. x-ray studies
      (4) CT scans
      (5) MRI scans

   c. Any three of the following:

      (1) Ultrasound
      (2) Amniocentesis
      (3) Endoscopic evaluations
      (4) Pelvic examinations
      (5) Pap smear
      (6) Schiller's test
      (7) Hysterosalpingography
      (8) Biopsies (Colposcopy, Conization of Cervix, Culdocentesis, or D&C)

Answers to Written Test

e. Any three of the following:

(1) X-rays and angiography (aortography, arteriography, cardiography, or venography)
(2) Echocardiography
(3) ECG (EKG)

10.	a.	F	e.	T
	b.	T	f.	T
	c.	T	g.	F
	d.	F		

11.	a.	T
	b.	F
	c.	T
	d.	F

12.	a.	6	e.	4	i.	12
	b.	3	f.	1	j.	8
	c.	10	g.	5	k.	11
	d.	9	h.	2	l.	7

Diagnostic Procedures
Unit 2

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

______a. Impenetrable to x-ray or other forms of radiation

______b. Passage of a tiny sterile plastic tube into the heart or a coronary artery to diagnose coronary disorders and anomalies

______c. Sound at frequencies above the range of human hearing

______d. Use of laboratory methods to establish a clinical diagnosis of the nature of disease

______e. Directions and depth of needle punctures through the skin to locate lesions in various organs or structures, or injection of a substance into or out of an organ or structure

______f. Programmable electronic device that can store, retrieve, and process data

______g. Electrical device that can control the beating of the heart by a series of rhythmic electrical discharges

______h. High-energy electromagnetic radiation waves that penetrate most solid matter to some extent and that act on photographic film; used both in diagnosis and treatment

1. Artificial cardiac pacemaker
2. Cardiac catheterization
3. Clinical pathology
4. Computer
5. Contrast medium
6. Intraoperative
7. Invasive
8. Noninvasive
9. Nonradiopaque
10. Percutaneous puncture
11. Preoperative
12. Radiopaque
13. Sensory evoked potentials
14. Surgical pathology
15. Ultrasound
16. X-rays

Written Test

______i. Procedures performed before the patient comes to the operating room suite or performed in the operating room before the incision is made

______j. Techniques using equipment placed into a body cavity or vessel and/or substances injected into body structures

2. Match the common methods of diagnosis with the correct descriptions.

______a. Use of electromagnetic energy and radio frequencies for identifying abnormalities in anatomical structures

______b. Use of sound vibrations to study alterations of anatomical structures

______c. Detecting and measuring variations of the heat emitted by various regions of the body and transforming them into visible signals that can be recorded photographically

______d. Branch of medicine that uses x-rays, radioactive substances, and ionizing radiations for diagnosis and treatment

______e. Visual examination of the interior of a body cavity or organ utilizing a lighted scope

1. Endoscopy
2. Magnetic resonance imaging
3. Pathology
4. Radiology
5. Thermography
6. Ultrasonography

Written Test

3. Match radiology equipment used in diagnostic procedures with the correct descriptions.

______a. Protective devices to shield personnel from radiation exposure

______b. Amplifies the fluoroscopic optical image projected onto a television screen; is directly under the x-ray tube

______c. Lightproof holder for x-ray film that can fit into or be attached to the operating table

______d. X-ray tube mounted on a portable electric or battery-powered generator that may be moved from room to room

1. Cassette
2. Fluoroscope
3. Image intensifier
4. Lead aprons/shields
5. Portable x-ray machine
6. Radiographic table top

4. Complete the following statements concerning the characteristics of computed tomography (CT) scans by circling the correct answers.

a. Uses (a laser, an x-ray) beam in conjunction with computer graphics technology

b. Produces a sequential series of positive images of (horizontal, transverse, vertical) sections of organs and anatomical structures

c. Tube and photomultiplier detectors rotate around the patient (90, 180) degrees.

d. Differences in tissue (density, temperature) are shown in different shades of gray or colors.

e. CT scans present a hazard to the patient from (ionizing radiation, thermal burns).

f. The procedure is performed under the supervision of the (radiologist, surgeon).

Written Test

5. Match basic pathology diagnostic procedures with the correct descriptions.

_____a. Any tissue, fluid, or foreign body removed from the patient during the surgical procedure; will be sent to pathology for verification and/or diagnosis

_____b. Growing living material under sterile conditions in prepared nutrient media such as agar in order to obtain enough microorganisms to conduct tests on and to establish a diagnosis; material is commonly obtained from abscesses, wounds, or surgically removed tissue using sterile tubes

_____c. Cutting a thin piece of a frozen tissue specimen for examination under a microscope; performed on tissue when a rapid diagnosis is needed, usually while the patient is still anesthetized

_____d. Removal of living tissue, cell, or body fluid sample by means of an incision, trocar puncture, or aspiration needle; samples will be examined under a microscope by pathology personnel to determine the nature of the condition and to establish a diagnosis

1. Biopsy
2. Culture
3. Frozen section
4. Surgical specimen

6. Match types of endoscopes with their correct uses.

_____a. Used for visualization of the urinary bladder

_____b. Used for visualization of the peritoneal cavity through the anterior abdominal wall (requires small incision)

_____c. Used for direct visualization of the stomach

1. Arthroscope
2. Bronchoscope
3. Choledochoscope
4. Colonoscope
5. Culdoscope

Written Test

______d. Used for direct visualization of the rectum

______e. Used for direct visualization of the bronchus, its branches, and the mucosa of the trachea

______f. Used for direct visualization of the interior of the larynx

______g. Used for direct visualization of esophagus and cardia of the stomach

______h. Used for visualization of the common bile duct

______i. Used for visualization of intra-articular surfaces; generally the knee (requires small incision)

______j. Used for direct visualization of the entire large intestine

______k. Used for visualization of pelvic structures; scope is introduced through small incision in posterior vaginal cul-de-sac

______l. Used for visualization of renal pelvis, calyces, and upper ureter

6. Cystoscope
7. Esophagogastroduodenoscope
8. Esophagoscope
9. Gastroscope
10. Laparoscope
11. Laryngoscope
12. Mediastinoscope
13. Nephroscope
14. Proctoscope
15. Sigmoidoscope

7. Select true statements concerning characteristics of ultrasonography by placing a "T" or "F" next to the true or false statements.

______a. Use low frequency electromagnetic waves to produce an image or photograph of an organ or tissue

______b. Ultrasonic echoes are recorded as they strike tissues of different densities and elasticities.

______c. The basic component is a computer.

______d. Suction is applied to the skin to maintain airtight contact.

Written Test

8. Complete the following statements concerning characteristics of magnetic resonance imaging (MRI) by filling in the blanks with the correct answers.

   a. Uses ________________ energy and radio waves to form image

   b. One major application is ____

      ____.

   c. MRI is contraindicated for patients with ______________________.

   d. During an MRI procedure, the patient lies flat inside a large ________________.

   e. Patient must be kept ________________ for a lengthy period.

9. List three diagnostic procedures performed in each of the following surgical specialties.

   a. General surgery diagnostic procedures

      (1) ____

      (2) ____

      (3) ____

   b. Gastrointestinal diagnostic procedures

      (1) ____

      (2) ____

      (3) ____

   c. Obstetrics and gynecological diagnostic procedures

      (1) ____

      (2) ____

      (3) ____

d. Genitourinary diagnostic procedures

(1) ____________________

(2) ____________________

(3) ____________________

e. Cardiovascular diagnostic procedures

(1) ____________________

(2) ____________________

(3) ____________________

10. Select true statements concerning common features of angiographic procedures by placing a "T" or "F" next to the true or false statements.

______a. All procedures must be performed under general anesthesia.

______b. A percutaneous puncture may be used to gain access to the vessel.

______c. Contrast medium doses are calculated according to the patient's weight.

______d. Contrast medium should be warmed to 100°F.

______e. Patient should be kept informed as the procedure progresses.

______f. An automatic high-pressure injector correlates the injection of the contrast medium and the x-ray exposure.

______g. Automatic seriogram equipment takes very slow multiple exposures while the contrast medium is in sufficient concentration to visualize the vessels.

11. Select true statements concerning percutaneous transluminal coronary angioplasty by placing a "T" or "F" next to the true or false statements.

______a. Performed under fluoroscopy with image intensifier

______b. Coronary arteries are accessed only by the common iliac artery after performing a cutdown.

______c. A local anesthetic should be administered to the patient before the artery is exposed.

Written Test

______d. A balloon-tipped catheter is inflated and then is passed through a guiding catheter into the coronary artery and into the occluded area.

12. Sequence the steps for a pacemaker insertion by placing the numbers 1-12 in the appropriate blanks.

______a. The electrode (lead) is advanced into the right ventricle.

______b. The subclavian vein is located and encircled with umbilical tape.

______c. The electrode (lead) is brought through the tunnel and re-attached to the pulse generator.

______d. A pocket is created to hold the pulse generator.

______e. The vein is opened using a number 11 knife blade.

______f. Local anesthetic is administered to the patient.

__*5*__g. The pacing electrode (lead) is inserted through the dilator sheath.

______h. The patient is placed in Trendelenburg position.

______i. The incision is closed in layers using absorbable suture.

______j. The electrodes (leads) are attached to the external pulse generator for testing and then removed.

______k. The pulse generator is placed in the pocket.

______l. The electrode (lead) is stabilized in the right ventricular apex.

***Permission to duplicate this test is granted.**

Diagnostic Procedures
Unit 2

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Distinguish Among Diagnostic Procedures Rating ______

Comments: ____

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

***Permission to duplicate this form is granted.**

Diagnostic Procedures
Unit 2

Information Sheet

1. **Terms and definitions**

    a. **Artificial cardiac pacemaker** —Electrical device that can control the beating of the heart by a series of rhythmic electrical discharges

    Note: Artificial pacemakers can substitute for defective natural pacemakers (sinoatrial node in the heart). They may be external or internal (implanted) depending on where the electrodes are placed. A pacemaker may initiate atrial or ventricular contractions or both.

    b. **Cardiac catheterization** — Passage of a tiny sterile plastic tube (catheter) into the heart or a coronary artery to diagnose coronary disorders and anomalies

    c. **Clinical pathology** — Use of laboratory methods to establish a clinical diagnosis of the nature of disease

    d. **Computer** — Programmable electronic device that can store, retrieve, and process data

    Note: The computer has vastly expanded the capabilities of diagnostic medicine.

    e. **Contrast medium** — Radiopaque substance used to provide a contrast in density between the tissue or organ being filmed (x-rayed) and the medium

    Examples: Barium sulfate, Cystografin®, Cardiografin®

    f. **Intraoperative** — Procedures performed in the operating room as part of the operation

    g. **Invasive** — Techniques using equipment placed into a body cavity or vessel and/or substances injected into body structures

    h. **Noninvasive** — Techniques using equipment placed on or near the patient's skin but outside body tissues

    i. **Percutaneous puncture** — Directions and depth of needle punctures through the skin to locate lesions in various organs or structures, or injection of a substance into or out of an organ or structure

    j. **Preoperative** —Procedures performed before the patient comes to the operating room suite or performed in the operating room before the incision is made

Information Sheet

k. **Radiopaque** — Impenetrable to x-ray or other forms of radiation

Note: Radiopaque substances appear white on x-ray.

l. **Sensory evoked potentials** — Method of testing the function of certain sense organs, even if the subject is unconscious or uncooperative

m. **Surgical pathology** — Study of alterations in body tissues removed by surgical intervention

n. **Ultrasound** — Sound at frequencies above the range of human hearing

o. **X-rays** — High-energy electromagnetic radiation waves that penetrate most solid matter to some extent and that act on photographic film; used both in diagnosis and treatment

2. **Common methods of diagnosis**

a. **Radiology** — Branch of medicine that uses x-rays, radioactive substances, and ionizing radiations for diagnosis and treatment

Examples: Chest x-rays, CT scans, radiopaque dyes

b. **Pathology** — Branch of biological science that studies the nature and cause of diseases through changes in structure and function

c. **Endoscopy** — Visual examination of the interior of a body cavity or organ utilizing a lighted scope

d. **Thermography** — Detecting and measuring variations of the heat emitted by various regions of the body and transforming them into visible signals that can be recorded photographically

Note: This technique has been used to study blood flow to limbs and to detect cancer of the breast.

e. **Ultrasonography** — Use of sound vibrations to study alterations of anatomical structures

f. **Magnetic resonance imaging (MRI)** — Use of electromagnetic energy and radio frequencies for identifying abnormalities in anatomical structures

3. **Radiology equipment used in diagnostic procedures**

a. **Portable x-ray machine** — X-ray tube mounted on a portable electric or battery-powered generator that may be moved from room to room

b. **Cassette** — Lightproof holder for x-ray film that can fit into or be attached to the operating table

Information Sheet

c. **Image intensifier (C-arm)** —Amplifies the fluoroscopic optical image projected onto a television screen; is directly under the x-ray tube

d. **Lead aprons/shields** — Protective devices to shield personnel from radiation exposure

e. **Radiographic table top** — Special operating table made of material capable of being penetrated by x-rays (Bakelite® or acrylic)

f. **Fluoroscope** — Similar to an x-ray generator, except that it has an additional screen composed of fluorescent crystals; fluorescent light produces an optical image to be projected on a screen or retained on film

4. **Characteristics of computed (or computerized) tomography (CT) scans**

a. Uses an x-ray beam in conjunction with computer graphics technology

b. Produces a **sequential** series of positive images of transverse (cross) sections of organs and anatomical structures

Note: Computer technology can also take the information from the transverse sections to create a 3-dimensional image of the organ or structure being studied if necessary.

c. X-ray tube and photomultiplier detectors rotate around the patient 180 degrees.

d. Differences in tissue density are shown in different shades of gray or colors (depending on the monitor).

e. CT scans are very useful in identifying deviations from the norm.

f. CT scans present a hazard to the patient from ionizing radiation.

g. Allergic reactions to intravenous contrast media may result.

h. The procedure is performed under the supervision of the radiologist.

5. **Basic pathology diagnostic procedures**

a. **Biopsy**

(1) Removal of living tissue, cell, or body fluid sample by means of an incision, trocar puncture, or aspiration needle

(2) Samples will be examined under a microscope by pathology personnel to determine the nature of the condition and to establish a diagnosis

b. **Culture**

(1) Growing living material under sterile conditions in prepared nutrient media such as agar in order to obtain enough microorganisms to conduct tests on and to establish a diagnosis

(2) Material to be cultured is commonly obtained from abscesses, wounds, or surgically removed tissue (ex: bronchial washings) using sterile culture tubes.

Note: The length of time required for the culture to grow will vary.

c. **Frozen section**

(1) Cutting a thin piece of a frozen tissue specimen for examination under a microscope

(2) Performed on tissue when a rapid diagnosis is needed, usually while the patient is still anesthetized

Caution: Never place tissue for a frozen section in any type of fixative solution.

d. **Surgical specimen**

(1) Any tissue, fluid, or foreign body removed from the patient during the surgical procedure

(2) Will be sent to pathology for verification and/or diagnosis

Examples: Bone, organs, tissue, stones, foreign objects

6. **Types of endoscopes and their uses**

a. **Arthroscope** — Used for visualization of intra-articular surfaces; generally the knee (requires small incision)

b. **Bronchoscope** — Used for direct visualization of the bronchus, its branches, and the mucosa of the trachea

c. **Choledochoscope** — Used for visualization of the common bile duct

Note: This is used intra-operatively during an open procedure.

d. **Colonoscope** — Used for direct visualization of the entire large intestine

Information Sheet

e. **Culdoscope** — Used for visualization of pelvic structures; scope is introduced through small incision in posterior vaginal cul-de-sac

f. **Cystoscope** — Used for visualization of the urinary bladder

g. **Esophagogastroduodenoscope** — Used for direct visualization of the esophagus, stomach, and duodenum

h. **Esophagoscope** — Used for direct visualization of esophagus and cardia of the stomach

i. **Gastroscope** — Used for direct visualization of the stomach

j. **Laparoscope** — Used for visualization of the peritoneal cavity through the anterior abdominal wall (requires small incision)

k. **Laryngoscope** — Used for direct visualization of the interior of the larynx

l. **Mediastinoscope** — Used for visualization of lymph nodes or tumors in the superior mediastinum (requires small incision)

m. **Nephroscope** — Used for visualization of renal pelvis, calyces, and upper ureter

Note: This is used intra-operatively during an open procedure.

n. **Proctoscope** — Used for direct visualization of the rectum

o. **Sigmoidoscope** — Used for direct visualization of the sigmoid colon

Note: The surgical procedure for the use of each endoscope will be covered with each surgical specialty unit. There are many other types of endoscopes in addition to these listed.

7. **Characteristics of ultrasonography**

a. Uses high-frequency sound waves to produce an image or photograph of an organ or tissue

b. Ultrasonic echoes are recorded as they strike tissues of different densities and elasticities.

c. The basic component is a specialized transducer that converts ultrasonic waves to electric impulses that can be digitized to produce images.

d. A water-soluble gel is applied to the skin to maintain airtight contact between the transducer and the skin.

Information Sheet

8. Characteristics of magnetic resonance imaging (MRI)

a. Uses electromagnetic energy and radio waves to form image

b. Does not use radiation

c. Defines soft tissues in relationship to bony and neurovascular structures

d. Distinguishes between fat, muscle, compact bone, bone marrow, brain, spinal cord, fluid-filled cavities, ligaments, tendons, and blood vessels

e. Major applications include:

  (1) Detection of tumors

  (2) Detection of inflammatory diseases

  (3) Detection of infections and abscesses

  (4) Evaluation of functions of cardiovascular and central nervous systems

f. Contraindicated for patients with pacemakers or ferromagnetic implants

Note: MRI can disable cardiac monitors used in the area.

g. Procedure for an MRI

  (1) Patient lies flat inside a large electromagnet. Patient must be kept immobile for a lengthy period.

  Note: Many patients experience claustrophobia during an MRI.

  (2) Bursts of alternating radio-frequency energy waves are emitted.

  (3) The body cells are stimulated from their state of equilibrium to excitement and back again emitting radio frequency signals.

  (4) The signals are converted by digital computer into two-dimensional color images displayed on a monitor and recorded on film.

Information Sheet

9. **Diagnostic procedures performed in surgical specialties**

   a. General surgery diagnostic procedures

      (1) Biopsies (tissues, lesions, masses)

      (2) Endoscopic evaluations (gastroscopy, laparoscopy, colonoscopy)

      (3) Needle aspiration (blood, body fluids, tissue fluids)

      (4) Ultrasound (to identify structural defects)

      (5) Cholangiograms (to assess stones in the biliary tract)

      (6) CT scans

      (7) MRI scans

   b. Gastrointestinal diagnostic procedures

      (1) Endoscopic evaluations (sigmoidoscopy, colonoscopy, gastroscopy)

      (2) Biopsies (tissues, lesions, masses)

      (3) Gastrointestinal x-ray studies (upper, lower GI series to identify lesions, tumors, or ulcers; includes barium swallows, enemas, and x-rays)

      (4) CT scans

      (5) MRI scans

   c. Obstetrics and gynecological diagnostic procedures

      (1) Ultrasound (commonly used to check condition of fetus)

      (2) Amniocentesis (aspiration of the amniotic fluid for chromosomal analysis)

      (3) Endoscopy evaluations (hysteroscopy, laparoscopy, culdoscopy)

      (4) Pelvic examinations (examination of external genitalia, uterus, fallopian tubes)

Information Sheet

(5) Papanicolaou (pap) smear (to study tissues of the cervix)

(6) Schiller's test (staining of the cervix to detect abnormal tissue)

(7) Hysterosalpingography (insertion of a water-soluble radiopaque dye to study function of the uterus and tubes)

(8) Biopsies (tissue, lesions, masses)

- Colposcopy (multiple specimens taken as biopsies from the cervix)
- Conization of the cervix (biopsy of the cervix with a scalpel)
- Culdocentesis (aspiration of fluid, blood, or pus from the cul-de-sac)
- Dilation and curettage (D & C of the cervix)

d. Genitourinary diagnostic procedures

(1) Intravenous pyelogram (IVP—X-ray visualization of the ureter and renal pelvis following injection of contrast medium)

(2) Retrograde pyelogram (X-ray visualization of the kidneys and ureters following injection of contrast media)

(3) Cystogram (X-ray visualization of the bladder following injection of contrast media)

(4) Urethrogram (visualization of the urethra following injection of contrast media)

(5) Endoscopic examination (Cystoscopy—lower urinary tract)

(6) Cystometrogram (measurement of the bladder's response to pressure and fluid capacity)

e. Head and neck diagnostic procedures

(1) Endoscopy evaluations

(2) Audiometry (hearing test)

(3) Biopsies

Information Sheet

  (4) CT scans

  (5) X-rays (fractures, structural anomalies)

  (6) MRI scans

  (7) Cultures

f. Ophthalmic diagnostic procedures

  (1) Visual field testing (detects diminished peripheral vision)

  (2) Tomography (use of an electronic device to measure the rate of aqueous outflow affecting intraocular pressure)

  (3) Gonioscopy (determines the structure of the angle between the iris and the cornea. Ex: If the angle is narrow, intraocular pressure will rise.)

  (4) Vitrectomy (Removal of a small amount of vitreous fluid for microscopic evaluation of possible endophalmitis and tissue for biopsy or intraocular tumors)

  (5) CT scans (identification of foreign bodies and tumors)

g. Orthopedic diagnostic procedures

  (1) X-rays (to detect foreign bodies and fractures)

  (2) CT scans

  (3) Ultrasound

  (4) MRI scans

  (5) Myelography (imaging spinal cord and nerves)

  (6) Arthrography (imaging inside a joint)

  (7) Arthroscopy (direct visual exam of a joint)

  (8) Biopsies (bone, muscle, masses)

Information Sheet

h. Neurologic diagnostic procedures

  (1) X-rays

    (a) Ventriculography (study of the ventricles after injection of air)

    (b) Electroencephalography (EEG—recordings made by brain cells to determine possible abnormalities)

    (c) Echoencephalography (ultrasonic waves used to detect brain tumors, hematomas, and swelling)

    (d) Myelography (contrast medium is injected into the subarachnoid space to visualize a herniated disc, tumor, or abnormality)

    (e) Cerebral angiography (visualization of cranial vessels after injection of contrast medium to detect tumors or other vascular lesions)

  (2) Sensory evoked potentials (measure neural pathways)

  (3) Lumbar puncture (needle puncture into the subarachnoid space to examine CSF, or to introduce anesthetics, medications, or contrast media)

  (4) CT scans (produce multiple x-rays of the brain and spinal cord to detect normal and pathologic anatomy)

  (5) MRI scans (detect alterations in body tissue)

i. Thoracic diagnostic procedures

Note: These diagnostic procedures are used to diagnose pathological processes and/or their exact location by obtaining tissue biopsies and/or secretion specimens.

  (1) Endoscopic procedures (bronchoscopy, esophagoscopy, laryngoscopy, mediastinoscopy)

  (2) Biopsies (tissues, fluid, masses)

  (3) CT scans

  (4) MRI scans

Information Sheet

j. Cardiovascular diagnostic procedures

Note: This will include more in-depth content. These procedures are usually performed in the Heart Cath Lab. The surgical technologist may be involved in assisting on many of these diagnostic and treatment procedures.

(1) X-rays and angiography (injection of a radiopaque substance for x-ray visualization of a specific blood vessel system)

(a) Aortography (study of the aorta and its branches to determine the size and site of lesions within the aorta or major branches)

Note: With patient in prone position, a 7-inch, 16 gauge needle is inserted through a translumbar approach. If fluoroscopic visualization is utilized, the femoral artery may provide access to the aorta via a catheter.

(b) Arteriography (study of the arterial circulation of a specific vascular system)

Examples: Carotid or vertebral to study cerebral circulation

(c) Cardiography (study of the chambers of the heart)

Note: Pressure measurements are recorded within the heart chambers, and a catheter is positioned under direct visualization through one of the great vessels into the heart.

(d) Venography (study of veins to show inflow, filling, and emptying to determine venous blood flow and valve action)

(2) Echocardiogram (Sonogram—sound waves provide two-dimensional color images of the beating heart helping to assess intraventricular blood volume during cardiac surgery)

(3) Electrocardiogram (ECG, EKG—a recording of electrical forces produced by the heart and translated as wave forms showing changes in rhythm, rate, or conduction)

10. Common features of angiographic procedures

a. All procedures may be performed under local or general anesthesia.

b. Access to the vessel to be injected with the contrast medium may be made by a cutdown or percutaneous puncture.

c. Contrast medium doses are calculated according to the patient's weight.

Information Sheet

d. Contrast medium may be warmed to body temperature.

e. If local anesthesia is used, patient should be kept informed as the procedure progresses.

f. A syringe with plastic tubing and an adaptor is connected to the needle or catheter in the vessel to prevent jarring during pressure injection of the contrast medium and to keep hands of operator out of the x-ray beam.

g. An automatic high-pressure injector may be used instead of injecting the contrast medium by hand.

h. The automatic high-pressure injector correlates the injection of the contrast medium and the x-ray exposure.

i. Special high-pressure nylon tubing is used with the pressure injector to prevent the separation of the tubing and the syringe.

j. A stopcock is placed on the end for closing it off at the syringe connection because nylon tubing cannot be clamped.

k. Automatic seriogram equipment takes rapid multiple exposures while the contrast medium is in sufficient concentration to visualize the vessels.

l. Automatic seriogram equipment can be set at 1/2 to 2 second intervals to take multiple pictures in succession.

11. Percutaneous transluminal coronary angioplasty

a. Performed under fluoroscopy with image intensifier

b. Coronary arteries are accessed by percutaneous femoral artery or brachial artery cutdown.

c. Performed under local anesthesia

d. Procedure is as follows:

(1) Prepare site of entry (femoral artery or brachial artery).

(2) Drape site according to physician's preference using aseptic technique.

(3) Local medications are administered to patient.

(4) Artery is exposed using aseptic technique.

Information Sheet

(5) A balloon-tipped catheter is passed through a guiding catheter into the coronary artery into the occluded area.

(6) The balloon is inflated by a hydraulic pump to compress the plaque against the wall of the artery and enlarge the lumen.

(7) This may be carefully repeated as necessary.

Note: A standby operating team must be available for emergency coronary artery bypass in the event that obstruction or perforation of the coronary artery occurs.

12. Pacemaker (permanent internal) insertion procedure

a. Local anesthetic is administered to the patient.

b. The patient is placed in Trendelenburg position.

c. The subclavian vein is located and encircled with umbilical tape.

d. The vein is opened using a number 11 knife blade.

e. The pacing electrode (lead) is inserted through the dilator sheath.

f. The electrode (lead) is advanced into the right ventricle.

g. The electrode (lead) is stabilized in the right ventricular apex.

h. The electrodes (leads) are attached to the external pulse generator for testing and then removed.

i. A pocket is created to hold the pulse generator.

j. The electrode (lead) is brought through the tunnel and re-attached to the pulse generator.

k. The pulse generator is placed in the pocket.

l. The incision is closed in layers using absorbable suture.

Diagnostic Procedures
Unit 2

Student Supplement 1—Describe the Uses of Various Endoscopes

Name ______________________ Date ______________

Directions: Describe the uses of each endoscope below.

1. Cystoscope — ______________________
2. Esophagogastroduodenoscope — ______________________
3. Mediastinoscope — ______________________
4. Colonoscope — ______________________
5. Proctoscope — ______________________
6. Bronchoscope — ______________________
7. Sigmoidoscope — ______________________
8. Nephroscope — ______________________
9. Esophagoscope — ______________________
10. Gastroscope — ______________________

Student Supplement 1

11. Laryngoscope — ____________________

12. Arthroscope — ____________________

13. Laparoscope — ____________________

14. Choledochoscope — ____________________

15. Culdoscope — ____________________

Diagnostic Procedures
Unit 2

Assignment Sheet 1—Distinguish Among Diagnostic Procedures

Name ______________________ Overall Rating __________

Evaluation criterion	**Rating**
Answers are correct	______

Directions: Place an "M" by the characteristics for Magnetic Resonance Imaging, a "U" for characteristics of Ultrasonography, and a "C" for characteristics of Computed Tomography scan.

______ 1. Uses electromagnetic energy and radio waves

______ 2. Contraindicated for patients with pacemakers or metal implants

______ 3. Uses high frequency sound waves to produce an image or photograph

______ 4. Uses x-rays

______ 5. Distinguishes between fat, muscle, compact bone, brain, and spinal cord.

______ 6. Produces a sequential series of positive images of transverse (cross) sections of organs and anatomic structures.

______ 7. Identifies structures by differences in tissue density.

______ 8. A water-soluble gel is needed to maintain airtight contact between the transducer and the skin.

______ 9. Causes feelings of claustrophobia

______ 10. Echoes are recorded as they strike tissues of different densities.

General Surgery
Unit 3

Objective Sheet

Unit Objective

After completing this unit, the student should be able to discuss basic procedures performed on hernias, the thyroid gland, and the breast. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to general surgery with their correct definitions.
2. State the purpose of a herniorrhaphy.
3. Match special terms relating to hernia surgery with their correct descriptions.
4. Identify regions of the abdomen where hernias may occur.
5. Match types of hernias with the correct descriptions.
6. Identify the parts of Hesselbach's triangle.
7. Differentiate between direct and indirect hernias.
8. Complete statements regarding special features of hernia surgery.
9. List basic instruments required for hernia surgery.
10. Complete statements concerning the procedure for an inguinal herniorrhaphy.
11. Complete statements concerning the procedure for a laparoscopic hernia repair.
12. Complete statements concerning the anatomy of the thyroid gland.
13. State the purpose of thyroid surgery.
14. List the main disorders of the thyroid.
15. Match basic surgical procedures on the thyroid with the correct descriptions.
16. Select true statements concerning special features of thyroid surgery.

Objective Sheet

17. List basic instruments required for thyroid surgery.
18. Complete statements regarding the procedure for a subtotal thyroidectomy.
19. Complete statements concerning the anatomy of the parathyroid gland.
20. Distinguish among the diseases of the parathyroid gland.
21. Match the basic procedures in parathyroid surgery with the correct descriptions.
22. Discuss special features of parathyroid surgery.
23. Complete statements concerning the anatomy of the breast.
24. Name the purpose of breast surgery.
25. Select true statements concerning special features of breast surgery.
26. Identify the types of breast incisions.
27. Match basic breast procedures with the correct descriptions.
28. List basic instruments required for breast surgery.
29. Complete statements concerning the procedure for an excisional breast biopsy.
30. Select true statements relating to the procedure for a modified radical mastectomy.
31. Discuss special techniques for cancer.
32. Determine needs for given cases involving general surgery. (Assignment Sheet 1)

General Surgery
Unit 3

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Abdominal Regions Where Hernias Occur (Objective 4)
   TM 2—Hesselbach's Triangle (Objective 6)
   TM 3—Thyroid and Parathyroid Glands (Objectives 12 and 19)
   TM 4—Anatomy of the Breast (Objective 23)
   TM 5—Breast Incisions (Objective 26)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

Suggested Activities

12. Discuss assignment sheet. Review criteria for evaluation of this activity.

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to general surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in general surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in general surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in general surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

6. Have assigned students give oral reports on their research about general surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in general surgery. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

7. Show videos of procedures common to general surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

8. Provide clinical orientation and guided clinical practice of general surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Atkinson, Lucy Jo. *Berry & Kohn's Operating Room Technique*, 7th ed. St. Louis: Mosby Year Book, Inc., 1992.

2. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1994.

Suggested Activities

3. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.
4. *Mosby's Medical, Nursing, and Allied Health Dictionary*, 4th ed. St. Louis: Mosby Year Book, Inc., 1994.
5. Phippen, Mark L. and Maryann Papanier Wells. *Perioperative Nursing Practice*. Philadelphia: W. B. Saunders Company, 1994.
6. *Techniques in Endosurgery: General Surgery: Laparoscopic Hernia Repair*. Cincinnati: Ethicon Endo-Surgery.

Suggested Supplemental Resources

1. *Technique of Total Thyroidectomy*, 1991 — SS7012
2. *Thyroid Lobectomy*, 1985 — VL0709
3. *Parathyroid Exploration*, 1988 — VL0718
4. *Physical Examination of the Breast*, 1987 — VL0707
5. *The Operative Management of Breast Cancer* — MS0702
6. *Immediate Breast Reconstruction: An Improved Method*, 1990 — ACS-1687
7. *Technique and Results of Needle Localization Breast Biopsy*, 1990 — ACS-1684
8. *Inguinal Hernia Repair*, 1989 — SS1006
9. *Laparoscopic Inguinal Herniorraphy*, 1990 — ACS-1686

1 - 9 are available from:

Cine-Med Video Library
127 Main Street North
P.O. Box 1007
Woodbury, CT 06798
800-253-7657 or 203-263-0080

Suggested Activities

10. *Teaching Breast Self-Examination*

11. *Mammography: The Life Saving Image*

10 and 11 are available from:

AJN Company
Educational Services Division
555 West 57th Street
New york, NY 10019-2961
800-CALL AJN or 212-582-8820
Fax: 212-586-5462

12. *In Touch With Your Breast* — Book and teaching model combination

13. *Mammography: The Whole Picture* — Booklet and Flip Chart

14. *Breast Care* — Booklet and Flip Chart

15. Breast lump display

16. Painted breast model DO51200 — Anatomy of breast disease

17. *Partners With Your Doctor* — Video teaching breast-cancer prevention

12 - 17 are available from:

HEALTH EDCO
P.O. Box 21207
Waco, TX 76702-1207
800-299-3366 Ext. 295 or 817-776-6461 Ext. 295
Fax: 817-751-0221

General Surgery
Unit 3

Answers to Student Supplements

Student Supplement 1

a. Isthmus
b. Thyroid
c. Cricoid cartilage
d. Thyroid cartilage
e. Hyoid bone
f. Superior parathyroid glands
g. Inferior parathyroid glands
h. Trachea

Student Supplement 2

a. Lactiferous
b. Nipple
c. Glandular
d. Adipose
e. Connective tissue—fascia
f. Pectoralis major
g. Ribs

Student Supplement 3

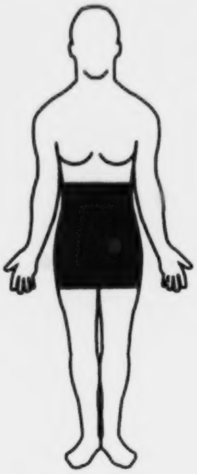
1. b
2. d
3. c
4. d
5. b
6. a
7. d
8. a
9. c
10. b
11. d
12. a
13. b
14. d
15. d
16. a
17. b
18. c
19. d
20. a
21. d
22. c
23. b
24. c
25. d
26. a
27. b
28. c
29. b
30. a

General Surgery
Unit 3

Answers to Assignment Sheet 1

Case A: Right inguinal hernia

1. Right inguinal hernia
2. Right inguinal herniorrhaphy
3. Supine
4. General, spinal or epidural block, regional with sedation, or local anesthesia
5. Drawing should show appropriately shaded area for prep, such as:



6. Either of the following:
    a. Surgeon may request the patient to cough or "bear down" during repair.
    b. Special supplies such as Penrose drain, sponges, and dissectors should be wet when passed to the surgeon.

Answers to Assignment Sheet 1

7. Mayo should be drawn as appropriate for procedure. Instruments should include the following: (others may be included as instructed)

6	Mosquito forceps — curved
6	Crile artery forceps — curved
2	Allis forceps
1	Metzenbaum dissecting scissors — curved
1	Mayo dissecting scissors — curved
1	Mayo dissecting scissors — straight (suture scissors)
1	Adson tissue forceps with teeth
2	Tissue forceps 5 1/2" with teeth
2	Tissue forceps 5 1/2" without teeth
2	USA retractors
2	Senn retractors
1	Richardson retractor small (3/4" × 1")
1	Richardson retractor medium (1 1/8" × 1 1/8")
1	Self-retraining retractor (Gelpi or Weitlaner)
2	Knife handles, no. 3
1	Knife handle, no. 7

Case B: Subtotal thyroidectomy

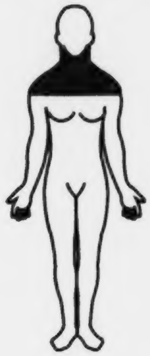
1. Hyperthyroidism

2. Subtotal thyroidectomy

3. Patient is placed in modified dorsal recumbent position with the neck hyperextended.

4. General anesthesia

5. Drawing should show appropriately shaded area for prep, such as:



Answers to Assignment Sheet 1

6. Any one of the following:

   a. A drain may be inserted to evacuate any fluid from the wound.
   b. The wound may be left open to the air or a thyroid collar dressing may be applied.
   c. Possible postoperative complications may include:

      - Impaired swallowing
      - Obstructed airway
      - Tetany
      - Temporary paralysis of the vocal cords

   d. A tracheostomy tray may be ordered to stay at the patient's bedside.

7. Mayo should be drawn as appropriate for procedure. Instruments should include the following: (Others may be included as instructed)

6	Mosquito forceps — curved
6	Mosquito forceps — straight
6	Crile artery forceps — curved
4	Allis forceps
4	Kochers
2	Small right angle clamps
4	Schnidt forceps

1	Metzenbaum dissecting scissors — curved
1	Mayo dissecting scissors — curved
1	Mayo dissecting scissors — straight (suture scissors)

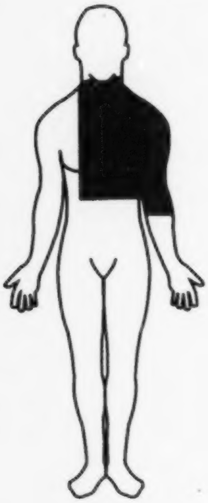
2	Adson tissue forceps with teeth
2	Brown-Adson forceps
2	Tissue forceps 5 1/2" with teeth
2	Tissue forceps 5 1/2" without teeth

2	USA retractors
2	Senn retractors
1	Richardson retractor small (3/4" × 1")
2	Skin hooks
1	Self-retaining retractor (Gelpi or Weitlaner)
2	Suction tips (Frazier and tonsil)
2	Knife handles, no. 3
1	Knife handle, no. 7
	Clip applier and clips

Answers to Assignment Sheet 1

Case C: Modified radical mastectomy

1. Infiltrating intraductal carcinoma of the left breast
2. Left modified radical mastectomy
3. Supine with involved arm extended on armboard
4. General
5. Drawing should show appropriately shaded area for prep, such as:



6. Any one of the following:
   a. The arm on the operative side should be draped free using a stockinette and drapes that allow free movement of the arm to facilitate access to the axilla.
   b. Breast tissue sent to the lab for estrogen-binding studies must be sent dry (no formalin).

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Answers to Assignment Sheet 1

7. Mayo should be drawn as appropriate for procedure. Instruments should include the following: (Others may be included as instructed)

10	Mosquito forceps — curved
6	Kelly hemostats — curved
6	Allis forceps
6	Lahey clamps
6	Kocher clamps

1	Metzenbaum dissecting scissors — curved
1	Mayo dissecting scissors — curved
1	Mayo dissecting scissors — straight (suture scissors)

1	Adson tissue forceps with teeth
1	Tissue forceps with teeth

2	USA retractors
2	Richardson retractors
2	Skin hooks
2	Berens skin-flap retractors

2	Knife handles, no. 3 with no. 10 blades

Accessory items: (may be included on Mayo)

Electrosurgical cautery
Marking pen
Suction tubing and tip
Surgical clips and appliers
Closed wound suction device

General Surgery
Unit 3

Answers to Written Test

1. a. 10
   b. 18
   c. 4
   d. 3
   e. 22
   f. 2
   g. 11
   h. 14
   i. 7
   j. 15
   k. 23
   l. 19
   m. 17
   n. 13
   o. 9

2. To repair the defect and to strengthen the supporting structures

3. a. 3
   b. 1
   c. 2

4. a. Hiatal (diaphragmatic)
   b. Epigastric
   c. Umbilical
   d. Inguinal
   e. Femoral

5. a. 5
   b. 2
   c. 6
   d. 1
   e. 4
   f. 3

6. a. Deep epigastric vessels
   b. Inguinal ligament
   c. Rectus abdominis

7. a. I
   b. D
   c. I
   d. D

8. a. Supine
   b. Must
   c. Penrose
   d. Moistened
   e. Mayo and Ferguson

Answers to Written Test

9. Any seven of the following: (may include but not be limited to)
   a. Mosquito forceps — curved
   b. Crile artery forceps — curved
   c. Allis forceps
   d. Metzenbaum dissecting scissors — curved
   e. Mayo dissecting scissors — curved
   f. Mayo dissecting scissors — straight (suture scissors)
   g. Adson tissue forceps with teeth
   h. Tissue forceps 5 1/2" with teeth
   i. Tissue forceps 5 1/2" without teeth
   j. USA retractors
   k. Senn retractors
   l. Richardson retractor small (3/4" × 1")
   m. Richardson retractor medium (1 1/8" × 1 1/8")
   n. Self-retraining retractor (Gelpi or Weitlaner)
   o. Knife handles, no. 3
   p. Knife handle, no. 7

10. a. Groin
   b. Electrocautery
   c. Fascia
   d. Penrose drain
   e. Transversalis fascia
   f. Spermatic cord
   g. 1st
   h. Interrupted
   i. Technologist

11. a. Advantages
   b. Insufflation
   c. Three
   d. Trendelenburg
   e. Peritoneum
   f. Mesh graft
   g. Staples
   h. Released

12. a. Iodine
   b. Front
   c. Isthmus
   d. Trachea
   e. Subclavian
   f. Laryngeal

Answers to Written Test

13. To treat various diseases of the thyroid

14. Any three of the following:

    a. Hyperthyroidism (Grave's disease)
    b. Hypothyroidism (Myxedema and cretinism)
    c. Enlarged gland (Goiter)
    d. Cancer

15. a. 2
    b. 1
    c. 4
    d. 3

16. a. F
    b. T
    c. T
    d. T
    e. T

17. Any ten of the following: (may include but not be limited to)

    a. Mosquito forceps — curved
    b. Mosquito forceps — straight
    c. Crile artery forceps — curved
    d. Allis forceps
    e. Kochers
    f. Small right angle clamps
    g. Schnidt forceps
    h. Metzenbaum dissecting scissors — curved
    i. Mayo dissecting scissors — curved
    j. Mayo dissecting scissors — straight (suture scissors)
    k. Adson tissue forceps with teeth
    l. Brown-Adson forceps
    m. Tissue forceps 5 1/2" with teeth
    n. Tissue forceps 5 1/2" without teeth
    o. USA retractors
    p. Senn retractors
    q. Richardson retractor small (3/4" × 1")
    r. Skin hooks
    s. Self-retraining retractor (Gelpi or Weitlaner)
    t. Suction tips (Frazier and tonsil)
    u. Knife handles, no. 3
    v. Knife handle, no. 7
    w. Clip applier and clips

Answers to Written Test

18. a. Surgeon's preference
    b. Marking pen, suture
    c. Platysma
    d. Greene or Army-Navy
    e. Lahey or Gelpi
    f. Recurrent laryngeal
    g. 2-0 or 3-0
    h. Penrose

19. a. 4
    b. Parathormone
    c. Calcium
    d. Thyroid

20. d

21. a. 3
    b. 1

22. Any two of the following:

    a. Positioning, prepping, and draping procedures are the same as for thyroid surgery.
    b. The incision and exposure is the same as for thyroidectomy.
    c. Several specimens may be obtained. As with every specimen, parathyroid specimens must be clearly labeled when sent to pathology for frozen section.

23. a. Pectoralis major
    b. 12-20
    c. Alveoli
    d. A single duct
    e. Areola
    f. Upper
    g. Adipose
    h. Spence
    i. 53

24. Any one of the following:

    a. Diagnostic
    b. Treatment

25. a. T   d. T
    b. F   e. F
    c. T   f. T

Answers to Written Test

26. a. Radial
    b. Supraareolar
    c. Infraareolar
    d. Inframammary

27. a. 8
    b. 12
    c. 6
    d. 1
    e. 10
    f. 9
    g. 3
    h. 2
    i. 7
    j. 11

28. a. Any six of the following: (may include but not be limited to)

    (1) Mosquito forceps — curved
    (2) Kelly hemostats — curved
    (3) Allis forceps
    (4) Metzenbaum dissecting scissors — curved
    (5) Mayo dissecting scissors — curved
    (6) Mayo dissecting scissors — straight (suture scissors)
    (7) Adson tissue forceps with teeth
    (8) Tissue forceps 5 1/2" with teeth
    (9) USA retractors
    (10) Senn retractors
    (11) Skin hooks
    (12) Knife handles, no. 3 with no. 10 and 15 blades

    b. Any six of the following: (may include but not be limited to)

    (1) Mosquito forceps — curved
    (2) Kelly hemostats — curved
    (3) Allis forceps
    (4) Lahey clamps
    (5) Kocher clamps
    (6) Metzenbaum dissecting scissors — curved
    (7) Mayo dissecting scissors — curved
    (8) Mayo dissecting scissors — straight (suture scissors)
    (9) Adson tissue forceps with teeth
    (10) Tissue forceps with teeth
    (11) USA retractors
    (12) Richardson retractors
    (13) Skin hooks
    (14) Berens skin-flap retractors
    (15) Knife handles, no. 3 with no. 10 blades

Answers to Written Test

29. a. Supine
    b. Electrosurgical pencil or dissecting scissors (Metzenbaum or Mayo)
    c. Small rake (Senn)
    d. Allis or Kocher
    e. Frozen section
    f. Absorbable
    g. Mastectomy

30. a. F
    b. T
    c. T
    d. F
    e. F
    f. T

31. Any two of the following:

    a. Tumor cells can spread by direct and indirect contact, so the involved area requires minimal and gentle handling to avoid dislodging tumor cells.
    b. To prevent cross contamination, each procedure should have a separate setup including instruments, drapes, gowns, and gloves.
    c. When a biopsy or frozen section and possible mastectomy are scheduled, two separate preps, drapes, and instrument setups are recommended (one for each procedure).
    d. If a procedure includes biopsies of tumors in both breasts, followed by frozen section and possible mastectomy, separate setups must be available for each biopsy as well as for the mastectomy.
    e. Some surgeons follow a technique in which instruments in contact with tumor cells are discarded after use.
    f. For multiple procedures on the same patient, each procedure should have its own setup which should include skin prep, instruments, sponges, drapes, gown, and gloves to prevent cross contamination.

General Surgery
Unit 3

Written Test

Name ______________________________ Date ________________ Score ______

1. Match the terms on the right with the correct definitions.

_____a. Localized tissue anemia due to obstruction of the inflow of arterial blood

_____b. Localized death of tissue

_____c. Cutting a thin piece of a frozen tissue specimen for examination under a microscope

_____d. An imperfection existing since birth

_____e. Major supporting structure of the posterior inguinal floor

_____f. Removal of a living tissue, cell, or fluid sample from the body and microscopic examination to determine its exact nature and to establish a diagnosis

_____g. Surgical opening of the abdomen; an abdominal operation

_____h. Radiography of the soft tissue of the breast to allow identification of various benign and malignant processes

_____i. Surgical repair of a hernia

_____j. Reconstructive surgery of the breast

_____k. Spontaneous new growth of tissue forming an abnormal mass

1. Benign
2. Biopsy
3. Congenital defect
4. Frozen section
5. Gynecomastia
6. Hernia
7. Hernioplasty or herniorrhaphy
8. Hesselbach's triangle
9. In situ
10. Ischemia
11. Laparotomy
12. Laparoscopy
13. Malignant
14. Mammography
15. Mammoplasty
16. Mastectomy

Written Test

______l. Inflation of the peritoneal cavity with carbon dioxide gas to prevent injury to abdominal structures during laparoscopic surgery

______m. Transfer of disease from one site to another

______n. Tending to infiltrate, metastasize, and produce death; cancerous

______o. In position; localized and noninvasive

17. Metastasis
18. Necrosis
19. Pneumoperitoneum
20. Tetany
21. Thermography
22. Transversalis fascia
23. Tumor
24. Xeroradiography

2. State the purpose of a herniorrhaphy.

____

3. Match special terms related to hernia surgery with their correct descriptions.

______a. Contents are trapped in the extra-abdominal sac and cannot be returned to the normal cavity

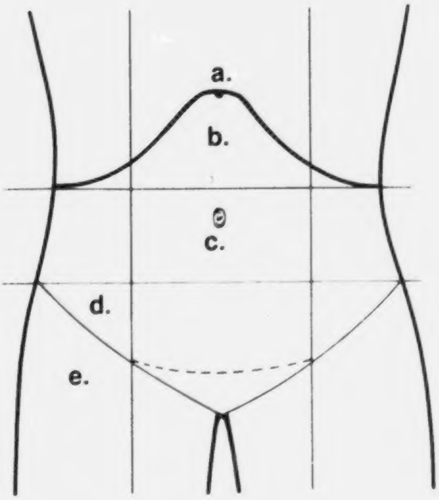
______b. Contents are trapped in the extra-abdominal sac, the blood supply is cut off, the sac contents become ischemic, and will eventually necrose

______c. Contents of the hernia sac can be returned to the normal intra-abdominal position

1. Strangulated hernia
2. Reducible hernia
3. Incarcerated hernia

Written Test

4. Identify regions of the abdomen where hernias may occur, and place your answers in the blanks provided.



a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________

5. Match types of hernias on the right with the correct descriptions.

______a. Direct or indirect hernias which represent attenuations or tears in the transversalis fascia

______b. Protrudes from the groin, below the inguinal ligament into the thigh

______c. Small fascial defects around the umbilicus

______d. Protrusions of fat through defects in the abdominal wall between the xiphoid process and the umbilicus

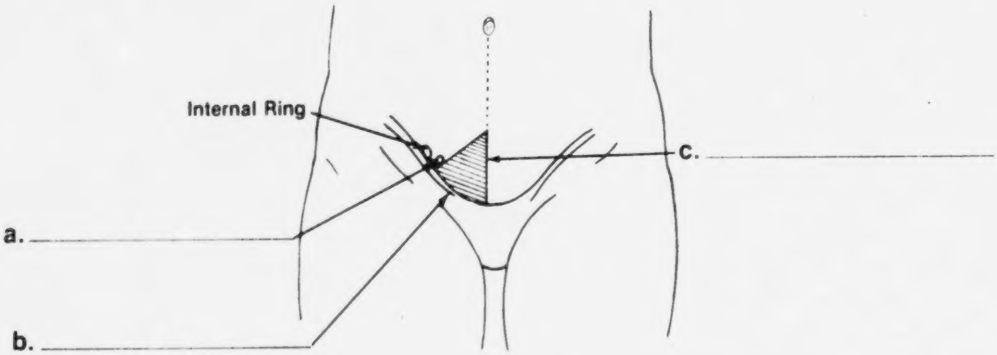
1. Epigastric
2. Femoral
3. Hiatal
4. Incisional
5. Inguinal
6. Umbilical
7. Ventral

Written Test

_______e. Postoperative hernia caused by a weakness in the abdominal wall from the incision or postoperative complications

_______f. Protrusion of a portion of the stomach through the opening for the esophagus which is through the diaphragm

6. Identify the parts of Hesselbach's triangle, and place your answers in the blanks provided.



7. Differentiate between direct and indirect hernias by placing a "D" next to the characteristics of direct hernias and an "I" next to those of indirect hernias.

_______a. Occur lateral to the deep epigastric vessels

_______b. Occur within Hesselbach's triangle

_______c. Protrude through the internal inguinal ring and pass with the spermatic cord structures down the inguinal canal; may descend into the scrotum

_______d. Protrude into the inguinal canal but not into the spermatic cord (and rarely into the scrotum)

Written Test

8. Complete statements regarding special features of hernia surgery by circling the correct answers.

    a. Patient is usually positioned in the (supine, Trendelenburg) position.

    b. Since the peritoneal cavity may be entered when the hernia sac is opened, accurate sponge, sharp, and instrument counts (may, must) be done.

    c. A (Jackson-Pratt, Penrose) drain is used to retract the spermatic cord structures.

    d. To decrease the trauma to the tissue, the drain should be (moistened, dry) when passed to surgeon.

    e. (Cutting and Keith, Mayo and Ferguson) needles may be utilized with interrupted sutures for the repair.

9. List seven of the basic instruments required on the Mayo for hernia surgery.

    a. ______________________________

    b. ______________________________

    c. ______________________________

    d. ______________________________

    e. ______________________________

    f. ______________________________

    g. ______________________________

10. Complete statements concerning the procedure for an inguinal herniorrhaphy by circling the correct answers.

    a. Patient is placed in the supine position and the area from above the umbilicus to mid-thighs is prepped and draped as for an abdominal procedure with the (groin, popliteal) area on the affected side exposed.

    b. Surgeon makes the incision over the hernia and uses the (electrocautery, shaw knife) for hemostasis.

    c. Surgeon incises the (fascia, muscle) lying over the spermatic cord and retracts with several hemostats.

Written Test

d. Surgical technologist mounts moistened (penrose drain, 4×4 sponge) on a medium clamp and passes it to the surgeon who passes it around the spermatic cord for retraction.

e. If hernia is direct, surgeon sutures (transversalis fascia, external oblique fascia) as technologist takes first closing count.

f. If hernia is indirect, surgeon dissects sac away from the (bladder, spermatic cord), opens the sac, and pushes the sac's contents back toward the abdomen.

g. Surgeon ligates or oversews indirect hernia sac as technologist takes (1st, 2nd) closing count.

h. Surgeon sutures transversalis fascial defect using heavy, (interrupted, continuous) sutures.

i. Surgeon passes specimen to (pathologist, technologist).

11. Complete statements concerning the procedure for a laparoscopic hernia repair by circling the correct answers.

a. Laparoscopic hernioplasty has a number of (advantages, disadvantages) over traditional, "open" hernioplasty.

b. Pneumoperitoneum is established using (an insufflation, a spinal) needle.

c. (Two, Three) trocars are introduced into the abdomen.

d. Patient is placed in (reverse Trendelenburg, Trendelenburg) position to shift the abdominal viscera.

e. The (peritoneum, vessels) and fat are pulled away from the muscle wall, and the hernia sac is dissected from the spermatic cord structures.

f. Upon completion of the dissection when the boundaries of the inguinal area are defined, a (mesh graft, prosthesis) is loosely placed in the direct space defect.

g. The peritoneal flaps are reapproximated and fixed with surgical (staples, glue).

h. All instruments are removed and the pneumoperitoneum is (expanded, released).

Written Test

12. Complete statements concerning the anatomy of the thyroid gland by circling the correct answers.

    a. The primary function of the thyroid gland is (calcium, iodine) metabolism.

    b. The thyroid gland is situated at the (back, front) of the neck.

    c. It consists of right and left lobes united by the (bridge, isthmus).

    d. Lobes lie below the larynx and beside the (trachea, pharynx).

    e. Blood supply to the thyroid is from the external carotid arteries and the (superior laryngeal, subclavian) arteries through the superior and inferior thyroid arteries.

    f. The recurrent (laryngeal, pharyngeal) nerve that supplies the vocal cord is in close association with the inferior thyroid artery.

13. State the purpose of thyroid surgery.

    ____

14. List three of the main disorders of the thyroid.

    a. ____

    b. ____

    c. ____

15. Match basic surgical procedures on the thyroid with the correct descriptions.

    ______a. Removal of a lobe of the thyroid gland

    ______b. Excision of all portions of the cyst and duct, as well as a portion of the hyoid bone, to avoid recurrent cystic formation and prevent infections

    ______c. Removal of the entire thyroid gland to treat a malignancy

    ______d. Removal of thyroid tissue to aid in establishing a diagnosis of thyroiditis and differentiate between nodular goiter and carcinoma

    1. Thyroglossal duct cystectomy
    2. Thyroid lobectomy
    3. Thyroid biopsy
    4. Total thyroidectomy
    5. Substernal or intrathoracic thyroidectomy

Written Test

16. Select true statements concerning special features of thyroid surgery by placing a "T" or "F" next to the true or false statements.

_____a. Patient is placed in Trendelenburg position with the neck hyperextended.

_____b. The operative area, including the anterior neck region, lateral surfaces of the neck down to the outer aspects of the shoulder, and upper anterior cheek region is prepped.

_____c. A drain may be inserted to evacuate any fluid from the wound.

_____d. The wound may be left without a dressing to permit observation of the neck in case of swelling, or a thyroid collar dressing may be applied to the wound.

_____e. Possible postoperative complications are impaired swallowing and obstructed airway related to postoperatively edema.

17. List ten basic instruments required on the Mayo for thyroid surgery.

a.	____________________	f.	____________________
b.	____________________	g.	____________________
c.	____________________	h.	____________________
d.	____________________	i.	____________________
e.	____________________	j.	____________________

18. Complete statements regarding the procedure for a subtotal thyroidectomy by filling in the blanks with the correct answers.

a. Patient is positioned, prepped, and draped according to ______________.

b. Surgeon defines the proposed incision line by using a ______________ or by pressing a ______________ against the patient's neck.

c. Surgeon incises the neck and subcutaneous tissue, exposing the ______________ muscle, while the assistant retracts with rake retractors.

d. ______________ retractors may be used for deep retraction.

e. When the thyroid is exposed, two small self-retaining retractors such as ______________ are placed in the wound.

Written Test

f. During surgery, the surgeon identifies and protects the ________________ nerve from damage since it supplies the larynx.

g. Suture ligatures of ________________ silk may be used to occlude the large thyroid arteries.

h. A wound drain is usually unnecessary, but a small ________________ drain may be inserted.

19. Complete statements concerning the anatomy of the parathyroid gland by circling the correct answers.

a. The parathyroid glands are (2, 4) small, yellowish-brown masses of tissue lying behind the thyroid gland.

b. The parathyroid glands release the hormone (parathormone, progesterone).

c. The primary function of the parathyroid gland is the regulation and maintenance of blood (calcium, potassium) concentration.

d. Blood supply is derived from the superior and inferior (parathyroid, thyroid) arteries.

20. Distinguish among the diseases of the parathyroid gland by placing an "X" next to the description of hyperparathyroidism.

______a. Tumor or abnormal growth of the parathyroid glands

______b. Increased potassium in the blood

______c. Decreased calcium in the blood

______d. Increased calcium in the blood

21. Match the basic procedures in parathyroid surgery with the correct descriptions.

______a. All parathyroids are removed due to abnormal pathology; a portion of the gland is immediately transplanted into a vascularized muscle, either the sternocleidomastoid or the forearm muscle

______b. Excision of one or more diseased parathyroid glands; normal glands are not to be damaged or resected

1. Parathyroidectomy
2. Subtotal parathyroidectomy
3. Total parathyroidectomy with autotransplantation

Written Test

22. Discuss two special features of parathyroid surgery.

    a. ____

    ____

    b. ____

    ____

23. Complete statements concerning the anatomy of the breast by circling the correct answers.

    a. Breasts are mammary glands that lie on the (pectoralis major, rectus abdominis) of the anterior chest wall.

    b. Each breast is made up of (12-20, 75-100) lobes that are separated by connective tissue and adipose tissue deposits.

    c. Each lobe is subdivided into lobules which contain the secreting cells, (alveoli, areola), arranged in grape-like clusters.

    d. Each lobe is drained by (several ducts, a single duct) that open(s) on the nipple.

    e. The nipple is surrounded by a circular pigmented area called the (alveoli, areola).

    f. The central and (upper, lower) portions of the breast are mostly glandular.

    g. The peripheral portions of the breast are mostly (adipose, connective) tissue.

    h. The breast approximates a circular outline except at the upper, outer quadrant where the axillary tail of (Spencer, Spence) lies well up into the axilla.

    i. There are an average of (53, 153) lymph nodes in the axillary area.

24. Name one purpose of breast surgery.

    ____

Written Test

25. Select true statements concerning special features of breast surgery by placing a "T" or "F" next to the true or false statements.

    ______a. Patients may be apprehensive about the possibility of having breast surgery.

    ______b. Patient is positioned on the OR table in the prone position.

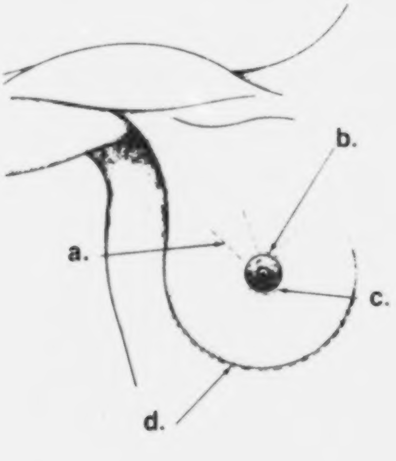
    ______c. Skin prep depends on the location of the lesion and the intended surgery.

    ______d. Draping should allow adequate exposure of the affected breast.

    ______e. Spinal anesthesia is usually preferred for a mastectomy.

    ______f. Breast biopsies may be performed under general or local anesthesia.

26. Identify the following types of breast incisions, and place your answers in the blanks provided.



a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

Written Test

27. Match basic breast procedures with the correct descriptions.

______a. Removal of the entire involved breast without lymph node or muscle dissection

______b. Excision of excessive breast tissue and reconstruction of symmetrical breasts

______c. Removal of the tumor mass with at least 1″ of surrounding normal tissue

______d. Surgical opening and drainage of an infected area of the breast

______e. Removal of the entire involved breast along with axillary lymph nodes, pectoral muscles, and all fat, fascia, and adjacent tissues

______f. Removal of the entire involved breast; all axillary lymph nodes are resected; the major pectoralis muscle is left in place; the minor pectoralis muscle may or may not be resected

______g. Mass is surgically incised and a portion taken for examination by pathologist

______h. Core of tissue is withdrawn using a large bore needle for examination by pathologist

______i. Removal of all breast tissue with the overlying skin and nipple being left intact

______j. Insertion of an inert prosthesis for the purpose of enlarging the breast

1. Incision and drainage of an abscess
2. Needle biopsy
3. Incisional biopsy
4. Excisional biopsy
5. Needle localization and biopsy
6. Partial mastectomy (lumpectomy)
7. Subcutaneous mastectomy
8. Simple mastectomy
9. Modified radical mastectomy
10. Radical mastectomy
11. Augmentation mammoplasty
12. Reduction mammoplasty
13. Male breast reduction

Written Test

28. List six basic instruments required on the Mayo for these two breast surgeries.

    a. Breast biopsy

        (1) ____________________

        (2) ____________________

        (3) ____________________

        (4) ____________________

        (5) ____________________

        (6) ____________________

    b. Modified radical mastectomy

        (1) ____________________

        (2) ____________________

        (3) ____________________

        (4) ____________________

        (5) ____________________

        (6) ____________________

29. Complete statements concerning the procedure for an excisional breast biopsy by filling in the blanks with the correct answers.

    a. Patient is placed in the __________________ position, prepped, and draped with the affected breast exposed.

    b. Surgeon may use the __________________ for dissection of the mass.

    c. A __________________ retractor may be used to retract the tissue.

    d. A __________________ clamp may be used to grasp the mass.

    e. The specimen may be sent to the lab for a __________________ or permanent section to determine whether it is malignant or benign.

f. If the mass is benign, the breast tissue may be approximated with __________________ suture.

g. If the mass is malignant, the surgeon will close and may or may not proceed with a __________________.

30. Select true statements relating to the procedure for a modified radical mastectomy by placing a "T" or "F" next to the true or false statements.

______a. Patient is placed in the prone position. The arm on the affected side is placed on an armboard but is not included in the scrub prep.

______b. Beren's retractors are commonly used to elevate the skin flaps.

______c. Blades dull easily and will need to be changed frequently.

______d. Wound is irrigated with plasmalyte.

______e. Surgeon closes with absorbable sutures or staples.

______f. Moderate pressure dressing is applied and may be held in place with Ace bandage or a surgical bra.

31. Discuss two special techniques for cancer.

a. ____

____

b. ____

____

*Permission to duplicate this test is granted.

General Surgery
Unit 3

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Cases Involving General Surgery Rating ______

Comments: ____

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ____

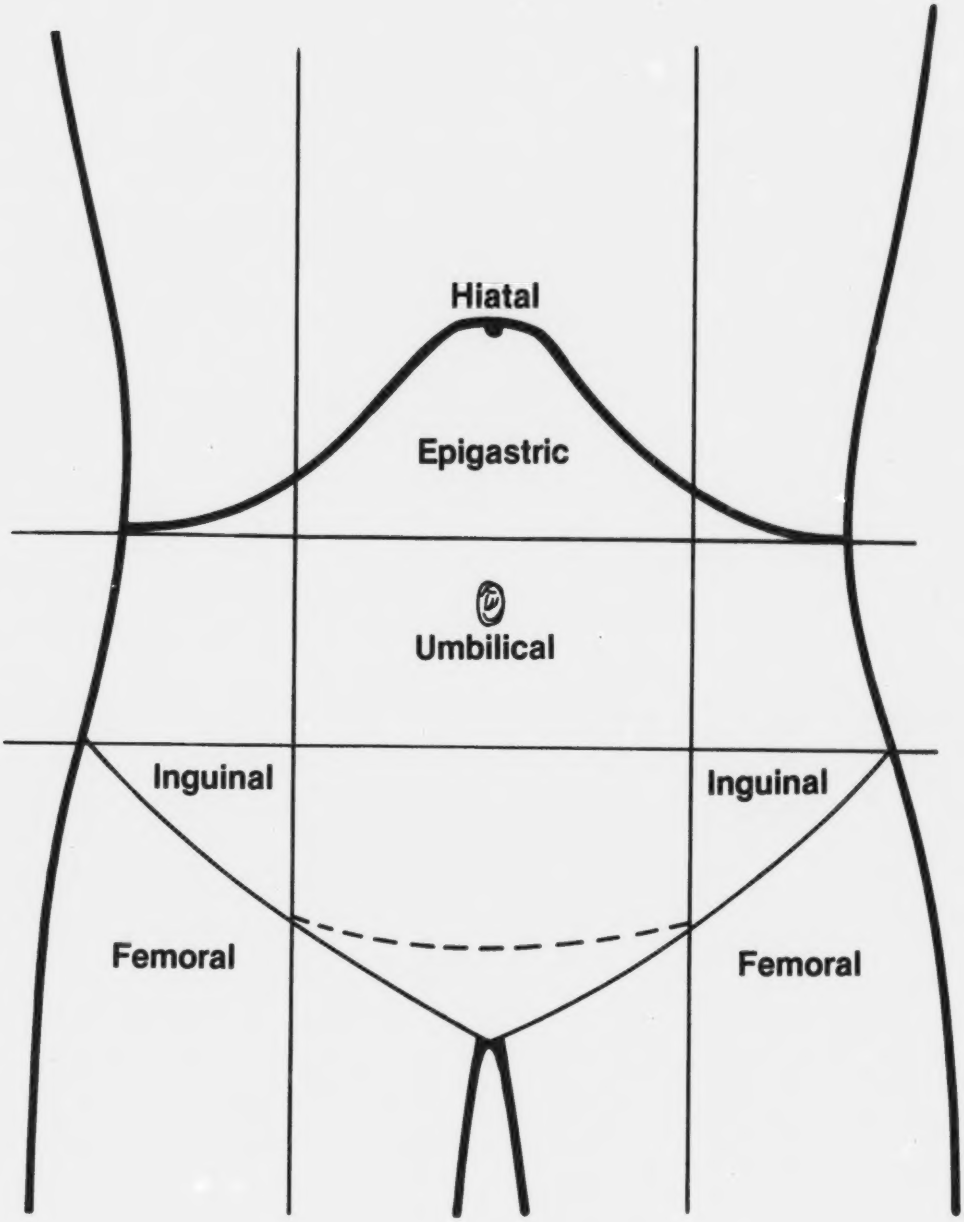
____

Teacher Signature ______________________________ Date __________

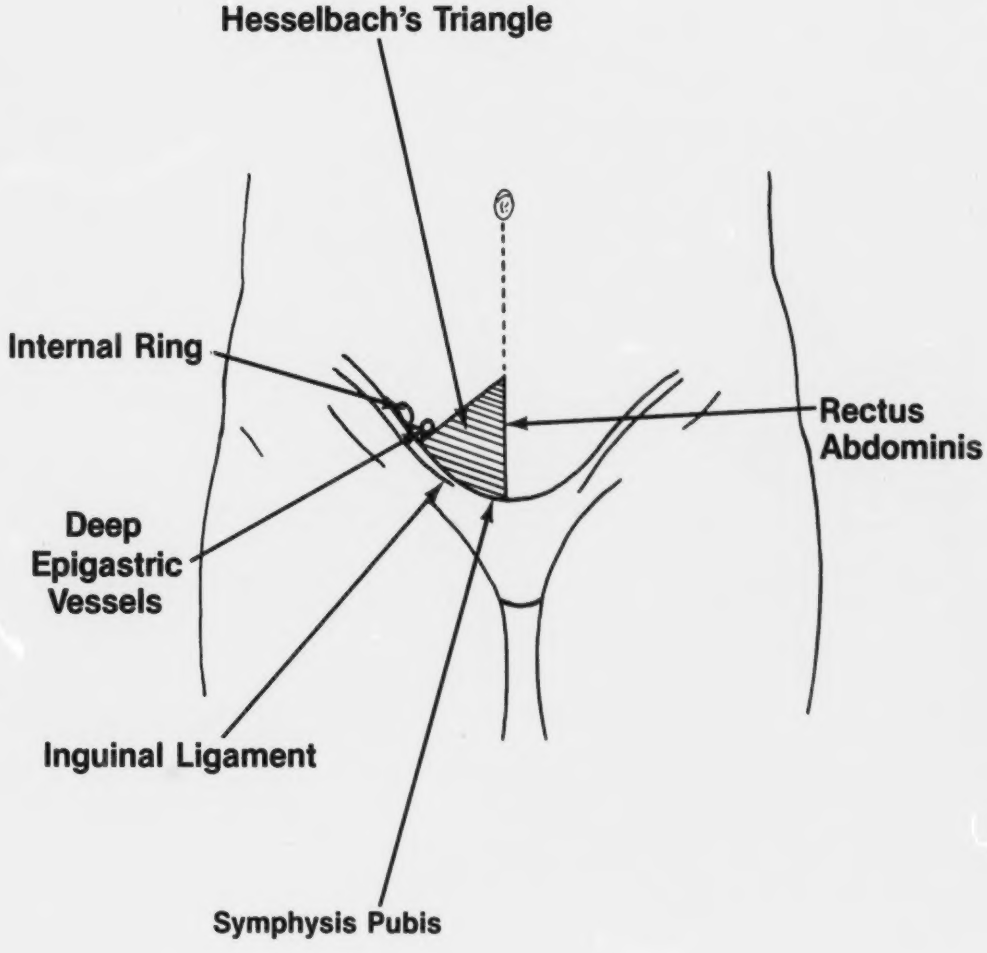
Student Signature ______________________________ Date __________

*Permission to duplicate this form is granted.

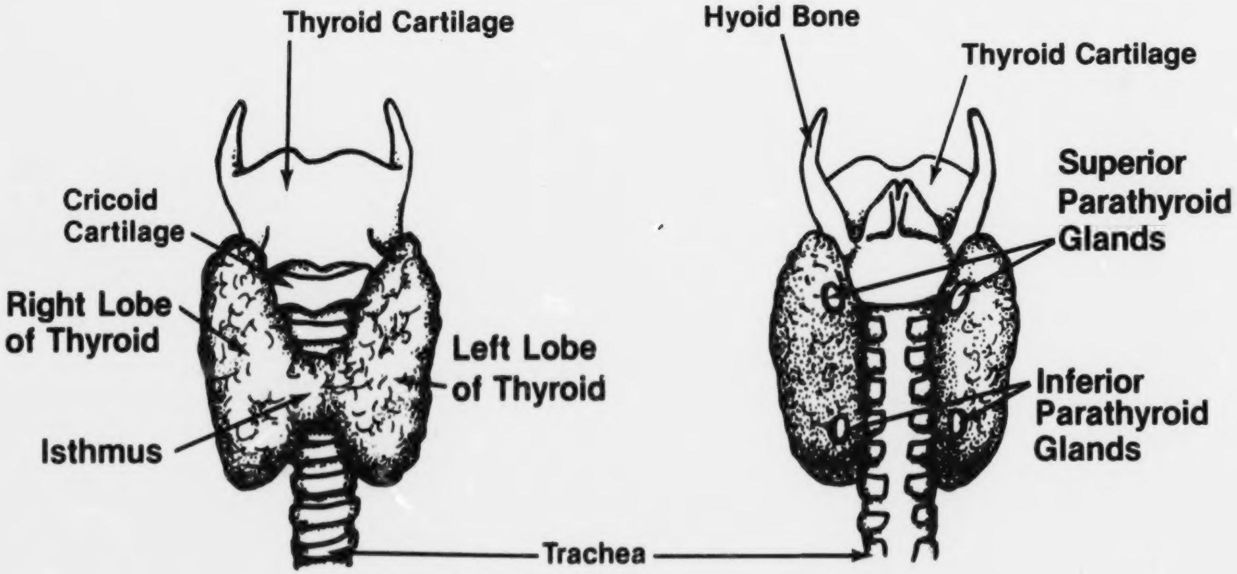
Abdominal Regions Where Hernias Occur


Hiatal
Epigastric
Umbilical
Inguinal
Inguinal
Femoral
Femoral

Hesselbach's Triangle


Hesselbach's Triangle
Internal Ring
Rectus Abdominis
Deep Epigastric Vessels
Inguinal Ligament
Symphysis Pubis

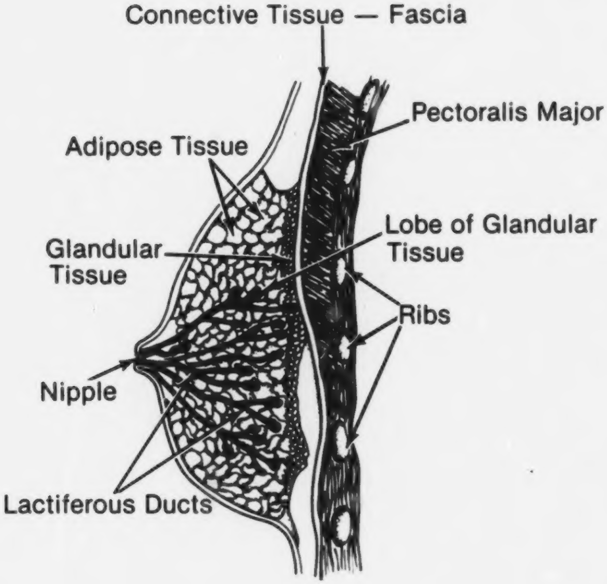
Thyroid and Parathyroid Glands

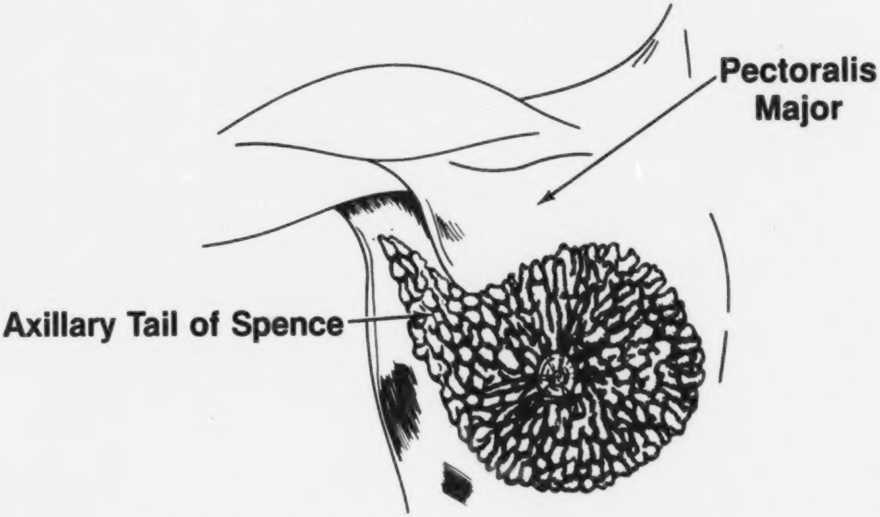

Thyroid Cartilage
Cricoid Cartilage
Right Lobe of Thyroid
Left Lobe of Thyroid
Isthmus
Hyoid Bone
Thyroid Cartilage
Superior Parathyroid Glands
Inferior Parathyroid Glands
Trachea

Anterior View of Thyroid

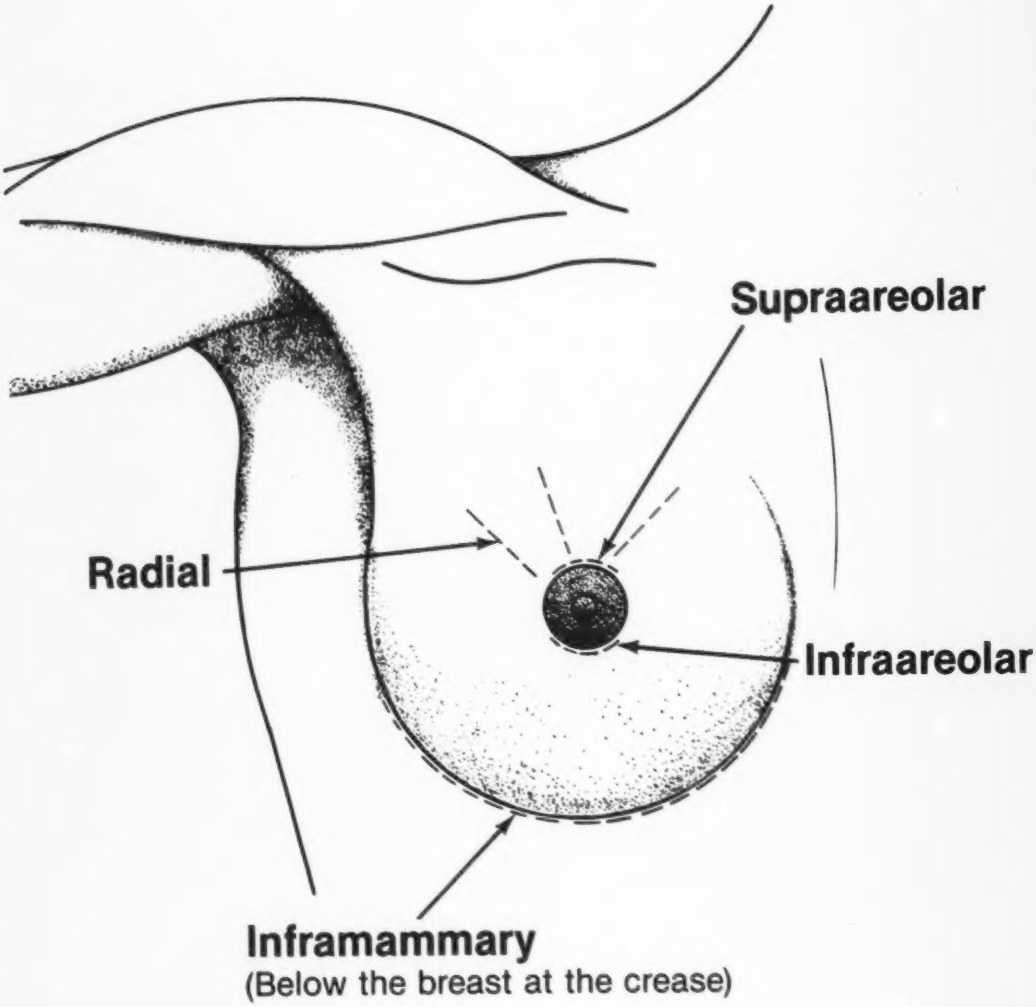
Posterior View of Thyroid

Anatomy of the Breast


Connective Tissue — Fascia
Pectoralis Major
Adipose Tissue
Lobe of Glandular Tissue
Glandular Tissue
Ribs
Nipple
Lactiferous Ducts


Pectoralis Major
Axillary Tail of Spence

Breast Incisions


Supraareolar
Radial
Infraareolar
Inframammary
(Below the breast at the crease)

General Surgery
Unit 3

Information Sheet

1. **Terms and definitions**

   a. **Benign** — Favorable; noncancerous

   b. **Biopsy** — Removal of a living tissue, cell, or fluid sample from the body and microscopic examination to determine its exact nature and to establish a diagnosis

   c. **Congenital defect** — An imperfection existing since birth

   d. **Frozen section** — Cutting a thin piece of a frozen tissue specimen for examination under a microscope

   Note: This test is performed on tissue when a rapid diagnosis is needed, usually while the patient is still anesthetized.

   e. **Gynecomastia** — Abnormal enlargement of the male breast(s)

   Note: Gynecomastia occurs primarily during puberty or after the age of forty. It is produced by a variety of diseases related to excessive hormone production or alterations in hormonal balance.

   f. **Hernia** — Protrusion of an organ or part of an organ through a defect in the supporting structures which normally contain it

   Note: A hernia may be congenital, acquired, or traumatic.

   g. **Hernioplasty or herniorrhaphy** — Surgical repair of a hernia

   h. **Hesselbach's triangle** — Area of the lower abdomen where direct inguinal hernias occur

   i. **In situ** — In position; localized and noninvasive

   j. **Ischemia** — Localized tissue anemia due to obstruction of the inflow of arterial blood

   k. **Laparotomy** — Surgical opening of the abdomen; an abdominal operation

   l. **Laparoscopy** — Exploration of the abdominal cavity with the use of an endoscopic instrument (laparoscope)

   Note: Additional procedures can be performed through the laparoscope after the exploration.

Information Sheet

m. **Malignant** — Tending to infiltrate, metastasize, and produce death; cancerous

n. **Mammography** — Radiography of the soft tissue of the breast to allow identification of various benign and malignant processes

o. **Mammoplasty** — Reconstructive surgery of the breast

p. **Mastectomy** — Excision of the breast

q. **Metastasis** — Transfer of disease from one site to another

r. **Necrosis** — Localized death of tissue

s. **Pneumoperitoneum** — Inflation of the peritoneal cavity with carbon dioxide gas to prevent injury to abdominal structures during laparoscopic surgery

t. **Tetany** — Condition of physiologic calcium imbalance marked by muscle spasms usually associated with deficient parathyroid secretion

u. **Thermography** — Technique for recording the amount of heat radiated from the surface of the body revealing abnormal cold or hot spots

Note: Disease conditions that manifest an increased or decreased blood flow present thermographic patterns that can be distinguished from those of normal areas.

v. **Transversalis fascia** — Major supporting structure of the posterior inguinal floor

w. **Tumor** — Spontaneous new growth of tissue forming an abnormal mass

x. **Xeroradiography** — Diagnostic x-ray technique in which an image is produced electrically rather than chemically

Note: This permits lower exposure times and radiation of lower energy than that of ordinary x-rays.

2. **Purpose of hernia surgery** — To repair the defect and to strengthen the supporting structures

3. **Special terms relating to hernia surgery**

a. **Reducible hernia** — Contents of the hernia sac can be returned to the normal intra-abdominal position

Note: The contents of the hernia sac may be abdominal or pelvic viscera as well as the surrounding supporting structures such as mesentery.

Information Sheet

b. **Incarcerated (irreducible) hernia** — Contents are trapped in the extra-abdominal sac and cannot be returned to the normal cavity

Note: Bowel present in an incarcerated (irreducible) hernia may develop a lack of adequate blood supply and become obstructed.

c. **Strangulated hernia** — Contents are trapped in the extra-abdominal sac, the blood supply is cut off, the sac contents become ischemic, and will eventually necrose

Note: A strangulated hernia requires immediate surgery to prevent necrosis of the strangulated bowel.

4. **Regions of the abdomen where hernias may occur** (Figure 1)

a. Hiatal (diaphragmatic)

b. Epigastric

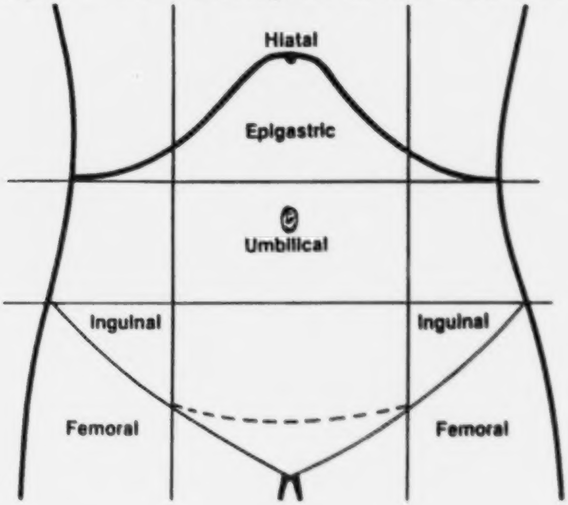
c. Umbilical

d. Inguinal

e. Femoral

Note: These regions also name the basic types of hernias. For example, a hernia in the femoral region is called a femoral hernia. The only basic type of hernia not listed above is the incisional hernia because it occurs in many abdominal regions.

Figure 1—Abdominal regions where hernias occur



Information Sheet

5. Types of hernias

a. **Inguinal** — Direct or indirect hernias which represent attenuations or tears in the transversalis fascia

b. **Femoral** — Protrudes from the groin, below the inguinal ligament into the thigh

c. **Hiatal** — Protrusion of a portion of the stomach through the opening for the esophagus (hiatus) which is through the diaphragm

Note: A hiatal hernia may be repaired by a thoracic surgeon using a thoracic approach rather than a general surgeon using an abdominal approach. A hiatal hernia is a surgical emergency in newborns if abdominal contents are in the chest.

d. **Ventral** — Any hernia through the abdominal wall; can appear after previous operations (incisional) or spontaneously (epigastric and umbilical)

(1) **Incisional** — Postoperative hernia caused by a weakness in the abdominal wall from the incision or postoperative complications

(2) **Epigastric** — Protrusions of fat through defects in the abdominal wall between the xiphoid process and the umbilicus

(3) **Umbilical** — Small fascial defects around the umbilicus

Note: These are common in children and usually disappear before they are 2 years old. When they don't disappear or when they occur in adults, surgery is indicated since they can become incarcerated.

6. Parts of Hesselbach's triangle

a. The following structures form Hesselbach's triangle:

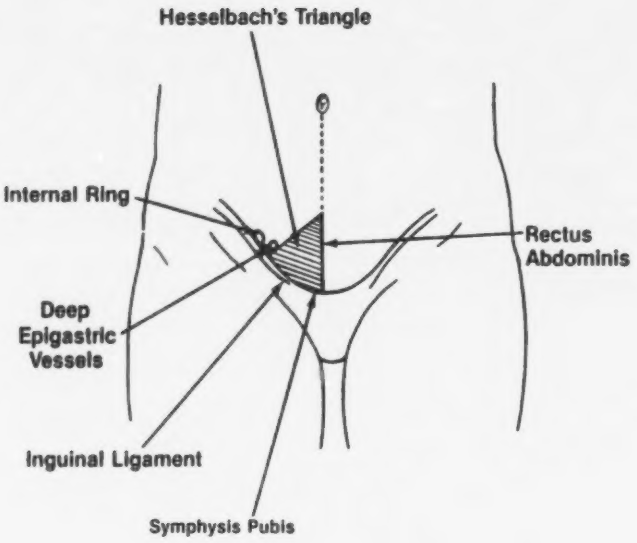
(1) Deep epigastric vessels laterally

(2) Inguinal ligament inferiorly

(3) Rectus abdominis muscle medially

Information Sheet

Figure 2


Hesselbach's Triangle
Internal Ring
Rectus Abdominis
Deep Epigastric Vessels
Inguinal Ligament
Symphysis Pubis

b. Hernias that occur in Hesselbach's triangle are called **direct** hernias.

7. **Direct and indirect inguinal hernias**

Note: The repair of an inguinal hernia depends on whether it is a direct or indirect hernia.

a. Direct

(1) Are acquired weaknesses in the transversalis fascia from heavy lifting, chronic coughing, or straining to urinate or defecate

(2) Occur within Hesselbach's triangle

(3) Emerge between deep epigastric artery and rectus abdominis muscle and protrude into the inguinal canal but not into the spermatic cord (and rarely into the scrotum)

(4) Appear more frequently in men

Information Sheet

b. Indirect

(1) Are congenital or acquired weaknesses in the transversalis fascia

(2) Occur lateral to the deep epigastric vessels

(3) Protrude through the internal inguinal ring and pass with the spermatic cord structures down the inguinal canal; may descend into the scrotum

(4) Appear more frequently in men

Note: Direct and indirect hernias may present as sliding hernias in which the posterior wall of the hernia sac is formed by bowel. When both direct and indirect hernias are present, the combined defect is called a pantaloon hernia.

8. Special features of hernia surgery

a. Patient is usually positioned supine.

b. Routine abdominal prepping and draping procedures are followed.

c. Surgery can be performed using various types of anesthesia: general, spinal or epidural block, regional with sedation, or local anesthesia.

Note: For an inguinal hernia, the surgeon may request the patient to cough or "bear down." Therefore, general anesthesia may not be desired.

d. Since the peritoneal cavity may be entered when the hernia sac is opened, accurate sponge, sharp, and instrument counts must be done.

e. A Penrose drain is used to retract the spermatic cord structures. A hemostatic clamp is placed on the drain before passing it to the surgeon.

f. To decrease the trauma to the tissue, special supplies should be moistened when passed to surgeon.

(1) The penrose drain should be moistened when passed to the surgeon.

(2) Sponges and dissectors are moistened for blunt dissection.

g. Mayo and Ferguson **taper** needles may be utilized with interrupted sutures for the repair.

h. Repair of the inguinal hernia requires the use of various types of sutures.

i. After the hernia is repaired, finer suture materials will be used for other layers of tissue.

Information Sheet

9. Basic instruments required for hernia surgery

a. Instruments used for herniorrhaphies are found in a standard laparotomy instrument set.

b. A self-retaining retractor such as Gelpi or Weitlaner facilitates the separation of tissue layers.

c. If the hernia is strangulated, instruments for bowel resection must be ready.

d. Basic mayo set up for hernia surgery may include, but not be limited to, the following instruments:

- 6 — Mosquito forceps — curved
- 6 — Crile artery forceps — curved
- 2 — Allis forceps

- 1 — Metzenbaum dissecting scissors — curved
- 1 — Mayo dissecting scissors — curved
- 1 — Mayo dissecting scissors — straight (suture scissors)

- 1 — Adson tissue forceps with teeth
- 2 — Tissue forceps 5 1/2″ with teeth
- 2 — Tissue forceps 5 1/2″ without teeth

- 2 — USA retractors
- 2 — Senn retractors
- 1 — Richardson retractor small (3/4″ × 1″)
- 1 — Richardson retractor medium (1 1/8″ × 1 1/8″)
- 1 — Self-retraining retractor (Gelpi or Weitlaner)

- 2 — Knife handles, no. 3
- 1 — Knife handle, no. 7

10. Procedure for an inguinal herniorrhaphy

a. Patient is placed in the supine position, and the area from above the umbilicus to mid-thighs is prepped and draped as for an abdominal procedure with the groin area on the affected side exposed.

b. Surgeon makes the incision over the hernia and uses the electrocautery for hemostasis.

c. Surgeon incises the fascia lying over the spermatic cord and retracts with several hemostats on the edge of the incised fascia.

Information Sheet

d. Surgeon identifies spermatic cord and separates it from the surrounding tissue.

e. Surgical technologist mounts moistened penrose drain on a medium clamp and passes it to the surgeon who passes it around the spermatic cord for retraction.

f. Surgeon continues to dissect until hernia is located.

g. Surgeon repairs hernia.

  (1) If hernia is direct,

    (a) Surgeon sutures transversalis fascial defect using heavy (0, 2-0) interrupted sutures as technologist takes first closing count.

    (b) Surgeon closes external oblique fascia as technologist takes second closing count.

  (2) If hernia is indirect,

    (a) Surgeon dissects sac away from the spermatic cord using Metzenbaum scissors.

    (b) The sac is opened and the edges grasped with hemostats.

    (c) Surgeon pushes contents of the sac back toward the abdomen with a finger or a small sponge on an instrument.

    (d) Surgeon ligates small sac, uses purse-string suture, or oversews to close large sac as technologist takes first closing count.

    (e) Surgeon sutures transversalis fascial defect using heavy (0, 2-0) interrupted sutures as technologist takes second closing count.

h. If specimen is taken, surgeon passes specimen to technologist.

Note: This specimen is the peritoneal hernia sac.

i. Surgeon closes individual layers of the wound.

Note: If the fascia is very weak, the surgeon may reinforce with synthetic mesh sewn directly to the fascial edges.

Information Sheet

11. Procedure for a laparoscopic hernia repair

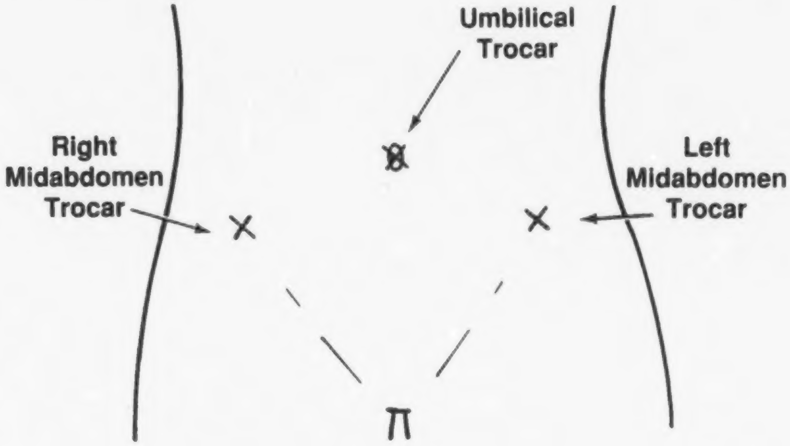
Note: Laparoscopic hernioplasty offers a number of advantages over traditional, "open" hernioplasty: (1) Shorter recovery time, (2) less pain in groin area, and (3) better repairs of bilateral and recurrent hernias.

a. The patient is prepped and draped for a lower abdominal incision.

b. Pneumoperitoneum is established using an insufflation (pneumoperitoneal) needle.

c. Three trocars are introduced into the abdomen.

Figure 3



d. Patient is placed in Trendelenburg position to shift the abdominal viscera.

Note: This allows the identification of important anatomic landmarks—the vas deferens, spermatic vessels, and several arteries and veins.

e. The peritoneum and fat are pulled away from the muscle wall, and the hernia sac is dissected from the spermatic cord structures.

f. Upon completion of the dissection when the boundaries of the inguinal area are defined, a mesh graft is loosely placed in the direct space defect.

g. A second sheet of mesh is placed over the inguinal area and secured with surgical staples.

h. The peritoneal flaps are reapproximated and fixed with surgical staples.

Information Sheet

i. All instruments are removed and the pneumoperitoneum is released.

j. The wounds are closed in routine manner.

k. Dressings are placed over each puncture site.

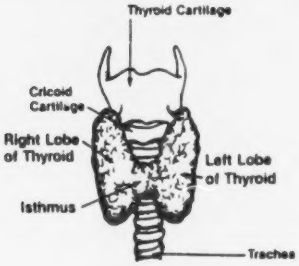
12. **Anatomy of the thyroid gland**

a. The primary function of the thyroid gland is iodine metabolism. It is also important in maintaining the metabolic rate at a level compatible with health and efficiency.

b. The thyroid gland is situated at the front of the neck.

c. It consists of right and left lobes united by the isthmus (middle portion).

Figure 4—Thyroid gland



Anterior View of Thyroid

d. Isthmus is situated near the base of the neck.

e. Lobes lie below the larynx and beside the trachea.

f. Blood supply to the thyroid is from the external carotid arteries and the subclavian arteries through the superior and inferior thyroid arteries.

g. The recurrent laryngeal nerve that supplies the vocal cord is in close association with the inferior thyroid artery.

13. **Purpose of thyroid surgery** — To treat various diseases of the thyroid

Information Sheet

14. **Main disorders of the thyroid**

    a. Hyperthyroidism (Grave's disease)

    b. Hypothyroidism (Myxedema and cretinism)

    c. Enlarged gland (Goiter)

    d. Cancer

15. **Basic surgical procedures on the thyroid**

    a. **Thyroid biopsy** — Removal of thyroid tissue to aid in establishing a diagnosis of thyroiditis and differentiate between nodular goiter and carcinoma

    b. **Thyroid lobectomy** — Removal of a lobe of the thyroid gland

    c. **Substernal or intrathoracic thyroidectomy** — Excision of enlarging goiters into the substernal and intrathoracic regions which may be causing tracheal and esophageal obstruction

    d. **Thyroglossal duct cystectomy** — Excision of all portions of the cyst and duct, as well as a portion of the hyoid bone, to avoid recurrent cystic formation and prevent infections

    e. **Total thyroidectomy** — Removal of the entire thyroid gland to treat a malignancy

16. **Special features of thyroid surgery**

    a. Patient is placed in modified dorsal recumbent position with the neck hyperextended.

    Note: A rolled bath blanket, inflatable pillow, or sandbag is placed under the patient's neck to accomplish the hyperextension.

    b. General anesthesia is usually administered.

    c. The operative area, including the anterior neck region, lateral surfaces of the neck down to the outer aspects of the shoulder, and upper anterior cheek region is prepped with an antimicrobial solution.

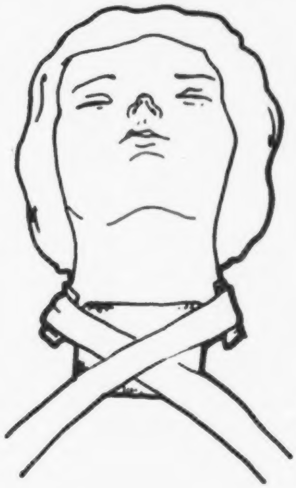
    d. A drain may be inserted to evacuate any fluid from the wound.

Information Sheet

e. The wound may be left without a dressing to permit observation of the neck in case of swelling, or a thyroid collar dressing may be applied to the wound.

Note: This type of dressing consists of strips of adhesive tape with a folded gauze covering its center portion. The dressing is brought from the back of the neck to the front, and the free ends of the collar are crossed and secured over the chest.

Figure 5—Thyroid collar dressing



f. Possible postoperative complications may include:

(1) Impaired swallowing

(2) Obstructed airway related to postoperatively edema

Note: A tracheostomy tray may be ordered to stay at the patient's bedside.

(3) Tetany

(4) Temporary paralysis of the vocal cords

Information Sheet

17. Basic instruments required on the Mayo for thyroid surgery

a. Basic mayo set up for thyroid surgery may include, but not be limited to, the following instruments:

- 6 — Mosquito forceps — curved
- 6 — Mosquito forceps — straight
- 6 — Crile artery forceps — curved
- 4 — Allis forceps
- 2 — Small right angle clamps
- 4 — Schnidt forceps

- 1 — Metzenbaum dissecting scissors — curved
- 1 — Mayo dissecting scissors — curved
- 1 — Mayo dissecting scissors — straight (suture scissors)

- 2 — Adson tissue forceps with teeth
- 2 — Brown-Adson forceps
- 2 — Tissue forceps 5 1/2″ with teeth
- 2 — Tissue forceps 5 1/2″ without teeth

- 2 — USA retractors
- 2 — Senn retractors
- 1 — Richardson retractor small (3/4″ × 1″)
- 2 — Skin hooks
- 1 — Self-retraining retractor (Gelpi or Weitlaner)
- 2 — Suction tips (Frazier and tonsil)
- 2 — Knife handles, no. 3
- 1 — Knife handle, no. 7
- Clip applier and clips

b. Additional instruments:

- 2 — Mastin muscle clamps
- 4 — Lahey thyroid tenaculum
- 2 — Green thyroid retractor
- 2 — Lahey thyroid retractor
- 1 — Beckman retractor

Information Sheet

18. Procedure for a subtotal thyroidectomy

a. Patient is positioned, prepped, and draped according to surgeon's preference.

b. Surgeon defines the proposed incision line by using a marking pen or by grasping a length of suture and pressing it against the patient's neck.

Note: This indentation will serve as a guideline for the incision.

c. Surgeon incises the neck and subcutaneous tissue, exposing the platysma muscle, while the assistant retracts with rake retractors.

d. Surgeon continues dissection and deeper retractors are used such as a Greene retractor or Army-Navy retractors if the wound is very deep.

Note: The electrosurgical pencil is used frequently to coagulate bleeders in the vascular tissue.

e. When the thyroid is exposed, two small self-retaining retractors such as Lahey or Gelpi are placed in the wound, and surgeon grasps the gland with one or two Lahey tenaculi designed for thyroid procedures.

f. Surgeon mobilizes the gland by double-clamping small sections of tissue, dividing between the clamps, and ligating the stumps. During dissection of the gland, the surgeon identifies and protects the recurrent laryngeal nerve from damage since it supplies the larynx.

Note: Some surgeons may prefer to use straight Kelly clamps or mosquito clamps for mobilization.

g. Suture ligatures of 2-0 or 3-0 silk may be used to occlude the large thyroid arteries.

h. When dissection has been completed, the specimen is passed to the technologist.

Note: A frozen section may be ordered to determine what type of disease is present.

i. Wound is irrigated. Drainage is usually unnecessary, but a small penrose drain may be inserted.

j. The layers of the neck tissue are closed individually, beginning with the platysma muscle. The skin edges are approximated with fine sutures or skin clips.

Information Sheet

k. Incision is dressed and dressings are secured by passing a gauze strip around the patient's neck.

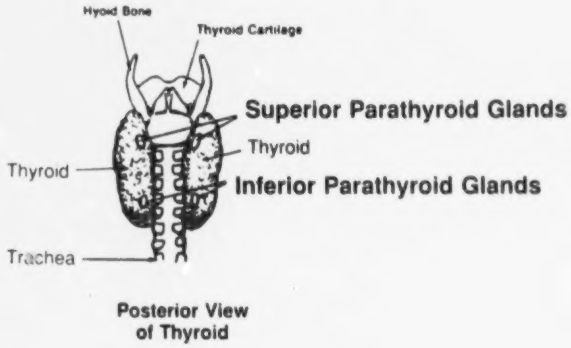
Note: Because of the danger of tracheal swelling and consequent obstructed airway, a tracheostomy tray must be available near the patient's bedside for the first 24 hours.

19. Anatomy of the parathyroid glands

a. The parathyroid glands are four small, yellowish-brown masses of tissue with the upper pair lying behind the superior pole of the thyroid, and the lower pair lying near the lower pole of the thyroid.

Note: While these usually lie behind the thyroid, occasionally they are embedded in the thyroid tissue.

Figure 6—Parathyroid glands


Hyoid Bone
Thyroid Cartilage
Superior Parathyroid Glands
Thyroid
Thyroid
Inferior Parathyroid Glands
Trachea
Posterior View
of Thyroid

b. The parathyroid glands release the hormone parathormone which is important in the metabolism of calcium.

c. The primary function of the parathyroid gland is the regulation and maintenance of blood calcium concentration.

d. Blood supply is derived from the superior and inferior thyroid arteries.

Information Sheet

20. Diseases of the parathyroid gland

a. Hyperparathyroidism — Increased calcium in the blood

Note: Untreated hyperparathyroidism leads to weakness and bone deformity, kidney stones, and ultimately mental retardation, convulsions, and death. It may be treated surgically.

b. Hypoparathyroidism — Decreased calcium in the blood

Note: Hypoparathyroidism may lead to convulsions and muscle spasms. It can be treated medically.

c. Parathyroid adenoma — Tumor or abnormal growth of the parathyroid glands; may cause excessive secretion of parathormone

21. Basic procedures in parathyroid surgery

Note: If all parathyroid glands are removed, tetany will result in the patient unless supplemental calcium is given.

a. Parathyroidectomy

(1) Excision of one or more diseased parathyroid glands

(2) Normal glands are not to be damaged or resected.

b. Subtotal parathyroidectomy

(1) Excision of the diseased gland, confirmed by frozen section

(2) Up to three and a half glands may be removed if all glands appear to be diseased.

(3) A portion of normal tissue is left to avoid hypoparathyroidism, which can lead to severe tetany.

(4) Any normal tissue that is removed may be cryopreserved for autotransplantation in the forearm muscle if hypoparathyroidism develops.

Information Sheet

c. Total parathyroidectomy with autotransplantation

(1) All parathyroids are removed due to abnormal pathology.

(2) A portion of the gland is immediately transplanted into a vascularized muscle, either the sternocleidomastoid or the forearm muscle.

Note: This procedure may be done when embedded parathyroid tissue is removed in conjunction with a total thyroidectomy.

22. Special features of parathyroid surgery

a. Positioning, prepping, and draping procedures are the same as for surgery of the thyroid.

b. The incision and exposure is the same as for thyroidectomy.

c. Several specimens may be obtained. As with every specimen, parathyroid specimens must be clearly labeled when sent to pathology for frozen section.

Note: Microscopic identification by a pathologist is necessary to differentiate parathyroid tissue from thyroid tissue.

23. Anatomy of the breast

a. Breasts are mammary glands that lie on the pectoralis major of the anterior chest wall.

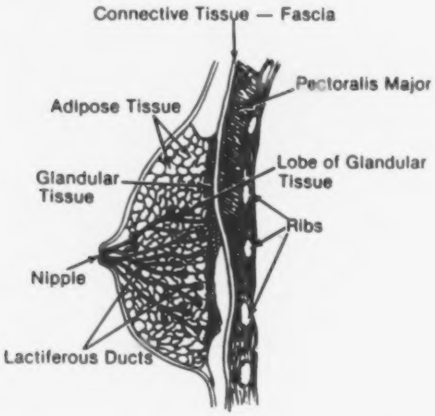
b. Each breast is made up of 12-20 lobes that are separated by connective tissue and adipose tissue deposits.

c. Each lobe is subdivided into lobules which contain the secreting cells, alveoli, arranged in grape-like clusters.

Information Sheet

d. Each lobe is drained by a single lactiferous duct that opens on the nipple.

Figure 7—Breast, lateral view


Connective Tissue — Fascia
Pectoralis Major
Adipose Tissue
Lobe of Glandular Tissue
Glandular Tissue
Ribs
Nipple
Lactiferous Ducts

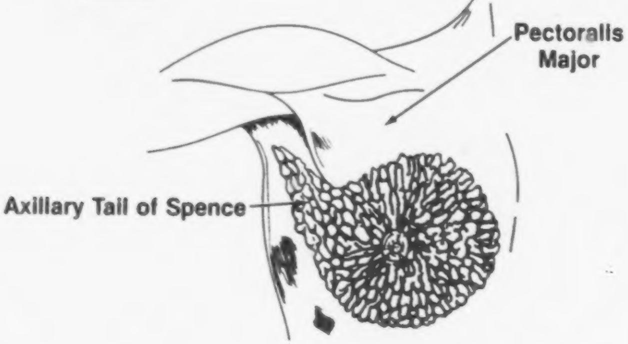
e. The nipple is surrounded by a circular pigmented area called the areola.

f. The central and upper portions of the breast are mostly glandular.

g. The peripheral portions of the breast are mostly adipose tissue.

h. The breast approximates a circular outline except at the upper, outer quadrant where the axillary tail of Spence lies well up into the axilla.

Figure 8


Pectoralis Major
Axillary Tail of Spence

i. There are an average of 53 lymph nodes in the axillary area.

Information Sheet

24. Purposes of breast surgery

a. Diagnostic

Examples: Mammography, xeroradiography, thermography, tissue biopsy

b. Treatment

Examples: Mastectomy, mammoplasty

25. Special features of breast surgery

a. Patients may be apprehensive about the possibility of having a malignancy, losing a body part, or facing emotional responses from family members.

b. Patient is positioned on the OR table in the supine position. The involved arm is extended on a padded armboard.

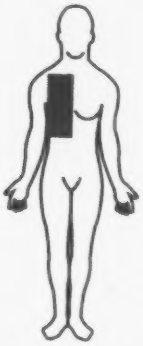
Note: A small pad may be placed under the operative side to facilitate better exposure of the incision area.

c. Skin prep depends on the location of the lesion and the intended surgery.

(1) For a breast biopsy, the affected breast and the surrounding area are prepped.

Note: It is important for the circulator to ask the patient to identify the correct breast and location of mass.

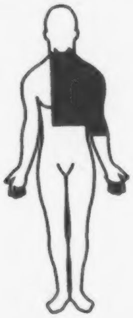
Figure 9—Right breast biopsy prep area shown shaded



Information Sheet

(2) For a mastectomy, the area prepped can extend from the clavicle to the umbilicus and from the opposite nipple to the bedside of the operative side, including the axilla, and possibly the upper arm of the operative side.

Figure 10—Left modified mastectomy prep area shown shaded



d. Draping should allow adequate exposure of the affected breast.

(1) For a breast biopsy, the affected area may be draped.

(2) For a mastectomy, the arm on the operative side should be draped free using a stockinette and other drapes to allow free movement of the arm and to facilitate access to the axilla.

Note: If a breast biopsy is to be immediately followed by a modified radical mastectomy, the surgeon may prefer to repeat the skin prep and re-drape before proceeding.

e. General anesthesia is usually preferred for a mastectomy because local infiltrate may conceal the tumor.

f. Breast biopsies may be performed under general or local anesthesia.

g. Breast tumors are evaluated for their estrogen and progestin-binding abilities to determine postoperative treatment.

Note: Breast tissue sent to the lab for estrogen-binding studies must be sent dry (no formalin).

26. Types of breast incisions

a. Radial (like spokes of a wheel)

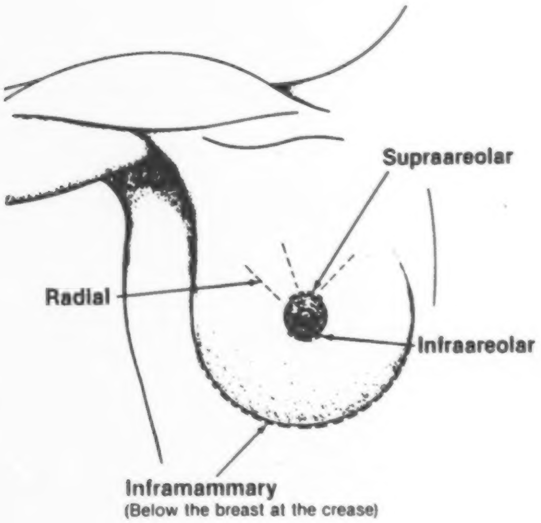
b. Supraareolar

c. Infraareolar

Information Sheet

d. Inframammary

Figure 11—Breast incisions


Supraareolar
Radial
Infraareolar
Inframammary
(Below the breast at the crease)

27. Basic breast procedures

a. Incision and drainage (I & D) of an abscess — Surgical opening and drainage of an infected area of the breast

b. Biopsies

(1) Needle biopsy — Core of tissue is withdrawn using a large bore needle (Silverman) for examination by pathologist

Note: This may be done in the physician's clinic.

(2) Incisional biopsy — Mass is surgically incised and a portion taken for examination by pathologist

(3) Excisional biopsy — Entire tumor mass is removed from adjacent tissue for examination by pathologist

Note: This is the most accurate type of biopsy since it allows examination of the whole mass and prevents a seeding of possible cancer cells..

Information Sheet

(4) Needle localization and biopsy (using mammography) — A small wire or needle is placed into the breast lesion using mammography, and the patient is taken to surgery for excisional biopsy.

Note: This technique is used to biopsy tumors discovered by mammogram that are too small to feel.

c. Mastectomies

(1) Partial (lumpectomy) — Removal of the tumor mass with at least 1" of surrounding normal tissue

Note: This is recommended for only small superficial lesions.

(2) Subcutaneous (Adenomammectomy) — Removal of all breast tissue with the overlying skin and nipple being left intact

Note: This may be performed for patients with chronic cystic mastitis, multiple fibroadenomas, or central noninvasive tumors. This is usually followed by implantation of a mammary prosthesis.

(3) Simple — Removal of the entire involved breast without lymph node or muscle dissection

Note: This is performed to halt the spread of cancer.

(4) Modified radical — Removal of the entire involved breast; all axillary lymph nodes are resected; the major pectoralis muscle is left in place; the minor pectoralis muscle may or may not be resected

Note: This is performed for infiltrating ductal and localized small malignant lesions. Breast reconstruction may be performed immediately, or in a few days, in patients with small lesions with no metastases.

(5) Radical — Removal of the entire involved breast along with axillary lymph nodes, pectoral muscles, and all fat, fascia, and adjacent tissues

Note: The radical mastectomy has been replaced in almost all cases by the simple mastectomy and the modified radical mastectomy to allow for breast reconstruction.

Information Sheet

d. Mammoplasty

(1) Augmentation — Insertion of an inert prosthesis for the purpose of enlarging the breast

(2) Reduction — Excision of excessive breast tissue and reconstruction of symmetrical breasts

e. Male breast reduction — Involves removal of all subareolar fibroglandular tissue and surgical reconstruction of the resultant defect primarily to treat gynecomastia

28. Basic instruments required in breast surgery

a. Basic Mayo set up for a breast biopsy may include, but not be limited to, the following instruments:

- 6 — Mosquito forceps — curved
- 4 — Kelly hemostats — curved
- 4 — Allis forceps
- 1 — Metzenbaum dissecting scissors — curved
- 1 — Mayo dissecting scissors — curved
- 1 — Mayo dissecting scissors — straight (suture scissors)

- 1 — Adson tissue forceps with teeth
- 1 — Tissue forceps 5 1/2" with teeth

- 2 — USA retractors
- 2 — Senn retractors
- 2 — Skin hooks
- 2 — Knife handles, no. 3 with no. 10 and 15 blades

b. Basic Mayo set up for a modified radical mastectomy may include, but not be limited to, the following instruments:

- 10 — Mosquito forceps — curved
- 6 — Kelly hemostats — curved
- 6 — Allis forceps
- 6 — Lahey clamps
- 6 — Kocher clamps

- 1 — Metzenbaum dissecting scissors — curved
- 1 — Mayo dissecting scissors — curved
- 1 — Mayo dissecting scissors — straight (suture scissors)

- 1 — Adson tissue forceps with teeth
- 1 — Tissue forceps with teeth

Information Sheet

- 2 — USA retractors
- 2 — Richardson retractors
- 2 — Skin hooks
- 2 — Berens skin-flap retractors

- 2 — Knife handles, no. 3 with no. 10 blades

c. Accessory items:

- Electrosurgical cautery
- Marking pen
- Suction tubing and tip
- Surgical clips and appliers
- Closed wound suction device

29. Procedure for an excisional breast biopsy

a. Patient is placed in the supine position, prepped, and draped with the affected breast exposed.

Note: Some surgeons prefer no prep at all because even gentle pressure may dislodge tumor cells.

b. Surgeon incises skin over the area of the mass.

c. Surgeon deepens the incision with the electrosurgical pencil or dissecting scissors (Metzenbaum or Mayo).

d. Technologist or assistant retracts the tissue with small rake retractors (such as Senn retractors).

e. Surgeon grasps the mass with Allis or Kocher clamps.

f. Surgeon continues to dissect as assistant or technologist elevates the mass with the clamps.

Note: Bleeders are cauterized or clamped and ligated as needed.

g. Surgeon completes dissection and passes specimen to technologist who must handle the specimen with particular care so as not to dislodge any cells or damage the specimen.

h. Specimen is sent to pathologist for frozen section or permanent section to determine whether it is malignant or benign.

Information Sheet

i. If the mass is benign, the subcutaneous breast tissue is approximated with absorbable suture, and the skin edges are closed with fine sutures or skin staples.

j. If the mass is malignant, the surgeon will close and may or may not proceed with a mastectomy at this time.

Note: The decision of whether or not to proceed with a mastectomy is usually based on the surgeon's prior discussion with the patient on the course of action she wishes to follow. If a mastectomy is to be done, the operative site must again be prepared and draped, with team members in fresh gowns and gloves, and a second set of instruments used to prevent contamination of the tissues with cancer cells.

k. If permanent section is ordered, surgeon closes.

Note: The findings of the permanent section will take 1-2 days, and the course of action will be decided upon at that time.

30. Procedure for a modified radical mastectomy

a. Patient is placed in the supine position. The arm on the affected side is placed on an armboard and included in the scrub prep.

b. Surgeon incises the skin around the breast elliptically and deepens with the electrosurgical pencil.

c. Skin flaps are elevated with Beren's retractors. Allis or Kocher clamps are placed along the breast tissue skin edges and retracted up by the surgeon or assistant.

d. Surgeon dissects the skin from the underlying tissue with #10 blade on #3 knife handle and/or electrosurgical unit.

   (1) Blades dull easily and will need to be changed frequently.

   (2) Metzenbaum scissors are used to isolate large vessels from the breast tissue when the surgeon extends the incision into the axilla.

e. Surgeon dissects the breast and axillary fascia away from the latissimus dorsi muscle and suspensory ligaments. The specimen is passed to the technologist.

f. Wound is irrigated with normal saline.

g. Surgeon places drainage tube in wound.

Information Sheet

h. Surgeon closes with nonabsorbable sutures or staples, anchors drainage tube, and connects it to closed suction reservoir.

i. Moderate pressure dressing is applied and may be held in place with Ace bandages or a surgical bra.

31. **Special techniques for cancer**

a. Tumor cells can spread by direct and indirect contact, so the involved area requires minimal and gentle handling to avoid dislodging tumor cells.

b. To prevent cross contamination, each procedure should have a separate setup including instruments, drapes, gowns, and gloves.

c. When a biopsy or frozen section and possible mastectomy are scheduled, two separate preps, drapes, and instrument setups are recommended (one for each procedure).

d. If a procedure includes biopsies of tumors in both breasts, followed by frozen section and possible mastectomy, separate setups must be available for each biopsy as well as for the mastectomy.

e. Some surgeons follow a technique in which instruments in contact with tumor cells are discarded after use.

Note: This minimizes the risk of spreading cancerous cells outside the operative area.

f. For multiple procedures on the same patient, each procedure should have its own setup which should include skin prep, instruments, sponges, drapes, gown, and gloves to prevent cross contamination.

General Surgery
Unit 3

Student Supplement 1—Review Anatomy of the Thyroid and Parathyroid Glands

Name ______________________________ Date ____________________

Directions: Identify the following structures of the thyroid and parathyroid glands, and place your answers in the blanks provided.

a. ____________________

b. ____________________

c. ____________________

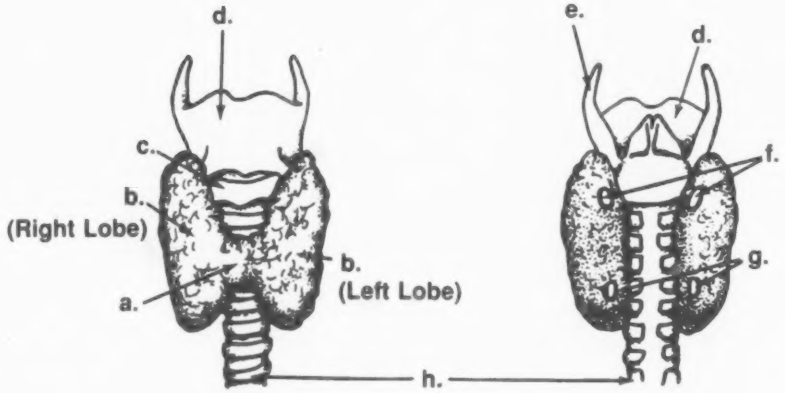
d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________



Anterior View of Thyroid

Posterior View of Thyroid

General Surgery
Unit 3

Student Supplement 2—Review Anatomy of the Breast

Name ______________________________ Date ____________________

Directions: Identify the following structures of the breast, and place your answers in the blanks provided.

a. ____________________ Ducts

b. ____________________

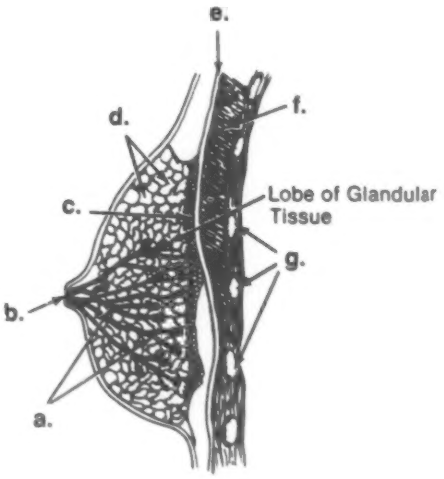
c. ____________________ Tissue

d. ____________________ Tissue

e. ____________________

f. ____________________

g. ____________________


e.
f.
d.
c.
Lobe of Glandular Tissue
g.
b.
a.

General Surgery
Unit 3

Student Supplement 3—Review General Surgery Concepts

Name ______________________________ Date ____________________

Directions: Select the best answer for each statement/question, and place your answers in the blanks provided.

_____ 1. Which structures are identified and preserved in thyroid surgery?

a. Hyoid bones
b. Parathyroid glands
c. Thyroglossal ducts
d. Thymus glands

_____ 2. A suture indention commonly marks the incision line in surgery of the:

a. Breast
b. Chin
c. Eye
d. Thyroid

_____ 3. What type of hernia passes through the inguinal ring into the inguinal canal?

a. Direct
b. Incarcerated
c. Indirect
d. Strangulated

_____ 4. In what procedure is a needle or wire inserted through a needle to identify suspicious breast tissue?

a. Incisional biopsy
b. MRI
c. Needle biopsy
d. Needle localization and biopsy

_____ 5. ______________ is a pathologic enlargement of the male breast.

a. Cystic mastitis
b. Gynecomastia
c. Hyperplasia
d. Subcutaneous fibroadenoma

Student Supplement 3

______ 6. Which hernia occurs in Hesselbach's triangle?

- a. Direct
- b. Femoral
- c. Indirect
- d. Hiatal

______ 7. Which of the following must be identified and preserved during a thyroid procedure?

- a. Facial nerve
- b. Inferior thyroid artery
- c. Isthmus of the thyroid
- d. Recurrent laryngeal nerve

______ 8. Which incision would require incising Scarpa's fascia?

- a. Inguinal
- b. McBurney
- c. Pfannenstiel
- d. Subcostal

______ 9. During a thyroidectomy, which instrument may be used to elevate a thyroid lobe?

- a. Beren's retractor
- b. Green retractor
- c. Lahey vulsellum forceps
- d. Senn retractor

______10. During a thyroidectomy, the Green retractor is used to retract what muscle?

- a. Brachial plexus
- b. Sternocleidomastoid muscle
- c. Subclavian muscle
- d. Thyroid muscle

______11. A specimen obtained during a herniorrhaphy is:

- a. Fascia
- b. Mesentery
- c. Omentum
- d. Peritoneum

Student Supplement 3

______12. A ________________ hernia is a protrusion of fat through a defect in the abdominal wall between the xiphoid process and the umbilicus.

a. Epigastric
b. Incisional
c. Inguinal
d. Umbilical

______13. A protrusion of a loop of an organ or tissue through a weak defect in the muscle structure is a/an:

a. Bowel obstruction
b. Hernia
c. Hydrocele
d. Rectocele

______14. What condition will occur if all parathyroid tissue is removed?

a. Hyperparathyroidism
b. Hypercalcemia
c. Septicemia
d. Tetany

______15. A ________________ hernia is one in which the sac contents become ischemic and will eventually necrose.

a. Reducible
b. Sliding
c. Spigelean
d. Strangulated

______16. The parathyroid glands regulate:

a. Blood calcium concentration
b. Blood potassium concentration
c. Blood sodium concentration
d. Blood iodine concentration

______17. A ______________ hernia is a protrusion of a portion of the stomach through the opening in the diaphragm.

a. Femoral
b. Hiatal
c. Inguinal
d. Ventral

Student Supplement 3

______18. The parathyroid glands are located __________________ to the thyroid gland.

a. Anterior
b. Inferior
c. Posterior
d. Superior

______19. Blood supply to the parathyroid glands is derived from the inferior and superior __________________ arteries.

a. Carotid
b. Laryngeal
c. Parathyroid
d. Thyroid

______20. During a laparoscopic herniorrhaphy, pneumoperitoneum is accomplished by instilling __________________ into the abdominal cavity.

a. Carbon dioxide gas
b. Nitrous gas
c. Normal saline
d. Oxygen

______21. Which of the following should be placed at the patient's bedside for a patient who has been treated surgically for hyperthyroidism?

a. Dressing change tray
b. Endotracheal tubes and intubation equipment
c. IV infusion tray
d. Tracheostomy tray

______22. There are __________________ parathyroid glands.

a. 2
b. 3
c. 4
d. 6

______23. A __________________ is a surgical procedure on the breast which removes the entire breast and axillary contents, but preserves the pectoral muscles.

a. Adenomammectomy
b. Modified radical mastectomy
c. Radical mastectomy
d. Silverman biopsy

Student Supplement 3

______24. The inferior and superior __________________ arteries are ligated during a thyroidectomy.

a. Carotid
b. Parathyroid
c. Thyroid
d. Subclavian

______25. During a laparoscopic hernia repair, the patient is placed in __________________ position to shift the abdominal viscera for better visualization.

a. Lithotomy
b. Prone
c. Reverse Trendelenburg
d. Trendelenburg

______26. When the blood supply has been obstructed, the tissue may be described as:

a. Ischemic
b. Malignant
c. Metastatic
d. Tetanic

______27. Which hernia leaves the abdominal cavity at the internal inguinal ring and passes with the cord structures down the inguinal canal?

a. Direct
b. Indirect
c. Epigastric
d. Umbilical

______28. What is used to retract the spermatic cord structures in an inguinal herniorrhaphy?

a. Foley
b. Jackson-Pratt
c. Penrose
d. T-Tube

______29. An incisional hernia can be described as a:

a. Small defect in the fascia around the umbilicus
b. Weakness in the abdominal wall from the incision
c. Protrusion from the groin
d. Protrusion of fat in the abdominal wall

Student Supplement 3

______30. Which hernia protrudes into the inguinal canal but not into the spermatic cord and rarely into the scrotum?

a. Direct
b. Incisional
c. Indirect
d. Femoral

General Surgery
Unit 3

Assignment Sheet 1—Determine Needs for Given Cases Involving General Surgery

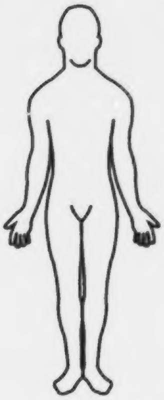
Name ______________________ Overall Rating ____________

Evaluation criteria	**Rating**
Answers are appropriate	_____
Descriptions use correct grammar, spelling, and punctuation	_____

Directions: Read each of the following cases, and fill in the blanks with the appropriate information required. Refer to the information sheets as needed.

Case A: A 28-year-old male is scheduled to have surgery to correct his right inguinal hernia.

1. The patient's diagnosis is ______________________.
2. The name of the procedure is ______________________.
3. The patient will be positioned ______________________.
4. The type of anesthesia most likely to be used is ______________________.
5. Shade in the area on the diagram that the circulator will prep for this surgery.



Assignment Sheet 1

6. Describe a special consideration regarding the care of this patient.

____

____

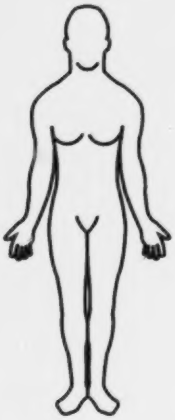
7. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Case B: A 32-year-old female has been diagnosed with hyperthyroidism. She is scheduled for a subtotal thyroidectomy.

1. The patient's diagnosis is ________________________________.
2. The name of the procedure is ______________________________.
3. The patient will be positioned ______________________________.
4. The type of anesthesia most likely to be used is ____________________.

Assignment Sheet 1

5. Shade in the area on the diagram that the circulator will prep for this surgery.



6. Describe a special consideration regarding the care of this patient.

____

____

7. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Assignment Sheet 1

Case C: On a routine self-breast exam, a 42-year-old female discovered a lump in her left breast. A breast biopsy confirmed the diagnosis of infiltrating intraductal carcinoma. She is now scheduled for a modified radical mastectomy.

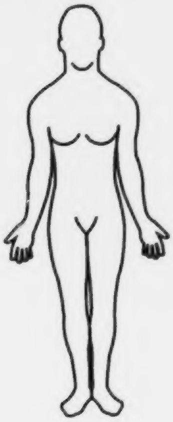
1. The patient's diagnosis is ______________________________.

2. The name of the procedure is ______________________________.

3. The patient will be positioned ______________________________.

4. The type of anesthesia most likely to be used is ____________________.

5. Shade in the area on the diagram that the circulator will prep for this surgery.



6. Describe a special consideration regarding the care of this patient.

____

____

Assignment Sheet 1

7. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Gastrointestinal Surgery
Unit 4

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match common biliary, gastric, intestinal, and rectal surgical procedures with the correct descriptions and describe special techniques used in gastrointestinal surgery. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to gastrointestinal surgery with their correct definitions.
2. Match endoscopic procedures commonly used in gastrointestinal surgery with the correct descriptions.
3. Identify the three types of anastomoses.
4. Complete statements concerning operations on the biliary tract.
5. List indications for biliary tract surgery.
6. Complete statements concerning the procedure for a cholecystectomy with operative cholangiogram.
7. Arrange in order the procedure for a laparoscopic cholecystectomy.
8. Match operations on the liver, spleen, and pancreas with the correct descriptions.
9. Complete statements concerning special bowel techniques used during intestinal surgery.
10. Distinguish between two basic bowel techniques.
11. Match gastric procedures with the correct descriptions.
12. Arrange in order the procedure for a Billroth II.
13. Arrange in order the procedure for a pyloromyotomy.

Objective Sheet

14. Match operations on the intestine with the correct descriptions.
15. List indications for resections of the small and large intestines.
16. Arrange in order the procedure for a resection of the small intestine.
17. Complete statements concerning the procedure for an appendectomy.
18. Arrange in order the procedure for a laparoscopic appendectomy.
19. Complete statements concerning characteristics of abdominoperineal resection.
20. Match operations on the anorectal region with the correct descriptions.
21. Arrange in order the procedure for a hemorrhoidectomy.
22. List specialized instruments for gastrointestinal surgery.
23. Determine needs for given gastrointestinal surgery cases. (Assignment Sheet 1)

Gastrointestinal Surgery
Unit 4

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—The Biliary System (Objective 1)
   TM 2—Parts of the Large Intestine—Colon (Objective 1)
   TM 3—Types of Anastomoses (Objective 3)
   TM 4—Intestinal Conditions (Objective 15)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Suggested Activities

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to gastrointestinal surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, staplers, and equipment required in gastrointestinal surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in gastrointestinal surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used in gastrointestinal surgery. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in gastrointestinal surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about gastrointestinal surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in gastrointestinal surgery. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

Suggested Activities .

9. Divide students into groups, and assign each group a different procedure commonly performed in gastrointestinal surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic set ups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communications skills, group effectiveness skills, influence skills**

10. Show videos of procedures common to gastrointestinal surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice of gastrointestinal surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology*. Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Activities

Suggested Supplemental Resources

1. *Ostomy Care*, 24-minute videotape that discusses the anatomy and physiology of the GI tract, reasons for colostomies, and types of ostomies.

2. *Laparoscopic Cholecystectomy: A Patient Education Program*, 9-minute videotape that describes the procedure and its advantages.

   1 and 2 are available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL AJN

3. *Upper GI X-Ray Series and Gastroscopy*, 12 minutes

4. *Lower GI X-Ray Series and Colonoscopy*, 12 minutes

5. *Ultrasound and CT Scan*, 11 minutes

6. *Liver Biopsy*, 9 minutes

7. *ERCP*, 8 minutes. Describes endoscopic retrograde cholangiopancreatography

   3 - 7 are available from:

   AIMS Media
   9710 DeSoto Avenue
   Chatsworth, CA 91311-4409
   800-367-2467 or 818-773-4300

8. *Care and Handling of the PI Instrument*, 12 minutes

9. *Gastric By-Pass*, 18 minutes

10. *Pitfalls in the Use of Anastomosing Stapling Instruments in Colorectal Surgery*, 23 minutes

    8 - 10 are available from:

    3M Health Care
    800-328-4827, ext. 1205

Suggested Activities

11. *Cholecystectomy and Common Bile Duct Exploration with Choledoscopy*, 1988. SS1002. 23 minutes

12. *Laparoscopic Cholecystectomy*, 1991. SS7013. 17 minutes

13. *Management of Large Colorectal Polyps*, 1989. ACS-1553. 28 minutes

14. *Laparoscopic Appendectomy*, 1992. ACS-1774. 15 minutes

15. *Hepatic Cystectomy (Enucleation) for Large Simple Cyst and Cystadenoma*, 1990. ACS-1623. 9 minutes

16. *Laparoscopic Cholecystectomy*, 1990. ACS-1604. 15 minutes.

11 - 16 (and many others) are available from:

Davis & Geck Video Library
c/o Cine-Med
127 Main Street North
P.O. Box 745
Woodbury, CT 06798
800-633-0004 or 203-263-0080

Gastrointestinal Surgery
Unit 4

Answers to Student Supplements

Student Supplement 1

a. Gallbladder
b. Liver
c. Hepatic duct
d. Pancreas
e. Pancreatic duct
f. Duodenum
g. Common bile duct
h. Cystic duct

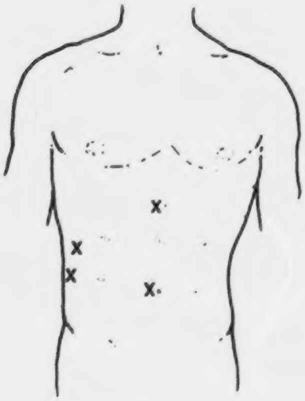
Student Supplement 2

a. Appendix
b. Cecum
c. Ascending
d. Hepatic
e. Transverse
f. Splenic
g. Descending
h. Sigmoid
i. Rectum
j. Anal canal

Gastrointestinal Surgery
Unit 4

Answers to Assignment Sheet 1

Case A:

1. Laparoscopic cholecystectomy with operative cholangiogram
2. Supine
3. Cystic duct
4. Common bile duct
5. 

6. Instructor should evaluate for completeness and appropriate arrangement.

Case B:

1. McBurney
2. Cecum or mesoappendix
3. Purse-string
4. Bowel technique—All items that come in contact with the bowel are contaminated and should be isolated in a separate basin from rest of field and not handled again.
5. Instructor should evaluate for completeness and appropriate arrangement.

Answers to Assignment Sheet 1

Case C:

1. Any three of the following:

   a. Carcinoma (cancer)
   b. Diverticulosis or Meckel's diverticula
   c. Ulceration
   d. Intussusception
   e. Volvulus
   f. Polyps
   g. Strangulated hernia
   h. Obstructions—tumors, adhesions

2. Answers will vary. Students may describe drop technique, clean closure technique, or another accepted bowel technique. Evaluate for completeness and basic understanding of concept.

3. Instructor should evaluate for completeness and appropriate arrangement.

Gastrointestinal Surgery
Unit 4

Answers to Written Test

1.	a.	14	g.	12	m.	10
	b.	11	h.	8	n.	20
	c.	1	i.	4	o.	22
	d.	6	j.	2	p.	19
	e.	3	k.	13	q.	21
	f.	5	l.	7	r.	18

2.	a.	2	d.	3
	b.	6	e.	8
	c.	5	f.	1

3. a. End-to-side
   b. Side-to-side
   c. End-to-end

4. a. Cholecystotomy
   b. Choledochotomy
   c. Jejunum
   d. Cholecystectomy
   e. Common bile duct
   f. Oddi

5. Any three of the following:

   a. Acute or chronic cholecystitis
   b. Cholelithiasis
   c. Carcinoma
   d. Biliary atresia
   e. Obstruction in the common bile duct

6. a. Right
   b. Cholangiogram
   c. Subcostal
   d. Laparotomy sponges
   e. Drain
   f. In a basin
   g. Common bile
   h. Cystic duct
   i. Clamp
   j. Cystic
   k. Surgeon
   l. Scoops

Answers to Written Test

m. Liver
n. Saline
o. A stab incision

7. a. 3
b. 6
c. 7
d. 1
e. 9
f. 5
g. 4
h. 8
i. 2

8. a. 2
b. 7
c. 5
d. 6
e. 4

9. a. Intestinal
b. Surgeon
c. Contaminated
d. Laparotomy sponges (tapes) or drapes
e. Separate basin, handled (used)
f. Any one of the following:

    (1) Adequacy of bowel preparation
    (2) Physical condition of the patient
    (3) Adequacy of blood supply to area of anastomosis
    (4) Viability of tissues

g. Gloves and/or gown and gloves
h. Any one of the following:

    (1) To isolate contaminated instruments and drapes
    (2) To provide sterile instruments, gowns, gloves, and drapes after anastomosis prior to closure

i. Two

10. a. D
b. D
c. C
d. D
e. C
f. C
g. C or D
h. C

Answers to Written Test

11. a. 6
  b. 8
  c. 1
  d. 3
  e. 9

12. a. 6
  b. 8
  c. 3
  d. 5
  e. 1
  f. 12
  g. 9
  h. 4
  i. 7
  j. 10
  k. 11
  l. 2

13. a. 5
  b. 3
  c. 6
  d. 1
  e. 4
  f. 2

14. a. 8
  b. 9
  c. 3
  d. 7
  e. 2
  f. 6
  g. 4

15. Any five of the following:

  a. Carcinoma
  b. Diverticulosis and Meckel's diverticula
  c. Ulceration
  d. Intussusception
  e. Volvulus
  f. Polyps
  g. Strangulated hernia
  h. Obstructions such as tumors or adhesions

16. a. 6
  b. 4
  c. 3
  d. 1
  e. 7
  f. 5
  g. 2

17. a. McBurney
  b. Assistant
  c. Surgeon
  d. Bowel
  e. Isolates
  f. Base
  g. Ligates
  h. Purse-string
  i. Amputates
  j. Inverts
  k. Dirty basin

Answers to Written Test

18. a. 3
    b. 2
    c. 8
    d. 9
    e. 7
    f. 1
    g. 4
    h. 6
    i. 5

19. a. Anus
    b. Rectum
    c. Permanent
    d. Lithotomy
    e. Slightly behind
    f. Next to
    g. Intestinal

20. a. 3
    b. 4
    c. 1
    d. 2

21. a. 8
    b. 2
    c. 7
    d. 3
    e. 5
    f. 1
    g. 4
    h. 6

22. Any three of the following for **each** category:

    a. Gallbladder instruments

       (1) Probes and dilators — Gall duct probes (Desjardin) and common duct dilators (Bakes)
       (2) Scoops — Gall stone scoops (Desjardin; Ferguson), common duct scoops (Mayo), and cystic duct scoops (Mayo)
       (3) Forceps — Gall duct forceps (Mixter, Lahey), gall bladder forceps (Mixter), and gall stone forceps (Mayo-Blake, Desjardin, Mixter, Randall)

    b. Gastrointestinal instruments

       (1) Tissue forceps (Allis, Thoms-Allis, Collin-Duval)
       (2) Intestinal forceps (Babcock, Collin, Bainbridge, Doyen, Kocher, Mayo-Robson, Scudder)
       (3) Intestinal clamps (Allen, Foss, Stone)
       (4) Anastomosis clamps (Dennis, DeMartel-Wolfson)
       (5) Pylorus clamps (Payr)

Answers to Written Test

c. Rectal instruments

(1) Rectal speculum (Pennington, Pratt, Sims)
(2) Rectal retractors (Cook, Sawyer)
(3) Scopes — Anoscope (Hirschman, Kelly), sphincteroscope (Kelly), and proctoscope (Hirschman, Kelly)
(4) Probes — Fistula probes (Barr, Buie) and rectal probes (Pratt)
(5) Crypt hooks (Pratt, Stewart, Barr)
(6) Hemorrhoidal ligator (McGivney) and hemorrhoid grasping forceps (McGivney)
(7) Tissue forceps (Allis, Thoms-Allis) and tissue grasping forceps (Pennington)
(8) Rectal scissors (Pratt, Kelly)
(9) Biopsy forceps (Yeoman, Turrell)

Gastrointestinal Surgery
Unit 4

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

______a. Invagination of proximal intestine into the lumen of the distal intestine causing intestinal obstruction

______b. Difficulty in swallowing

______c. Holding together by new tissue, produced by inflammation or injury, of two structures that are normally separate

______d. Injection of radiopaque solution into the cystic duct or into a tube placed in the common bile duct to permit x-ray identification of the biliary ductal system

______e. Imperforation or closure of a normal tubular opening of the body

______f. System of body parts conveying bile

______g. Narrow opening or crack of considerable length and depth

______h. Presence of stones in the gallbladder

______i. Yellow or greenish viscid alkaline fluid secreted by the liver which aids in the digestion and absorption of fats

______j. Union of parts or branches so as to intercommunicate

______k. Abnormal passage leading from an abscess or hollow organ to the body surface or from one hollow organ to another

1. Adhesion
2. Anastomosis
3. Atresia
4. Bile
5. Biliary tract
6. Cholangiogram
7. Cholecystitis
8. Cholelithiasis
9. Colon
10. Diverticula
11. Dysphagia
12. Fissure
13. Fistula
14. Intussusception
15. Mucosa
16. Peptic ulcer
17. Peritonitis
18. Polyp
19. Pyloric stenosis
20. Resection
21. Sphincter
22. Volvulus

Written Test

______l. Inflammation of the gallbladder

______m. Small, blind pouches that form in the lining and wall of a canal or organ, especially the colon

______n. Partial excision of a structure and reconstruction of the remaining parts

______o. Torsion of a loop of intestine causing obstruction

______p. Congenital abnormality resulting in the narrowing of the opening between the stomach and the duodenum

______q. Ring-like muscle that closes a natural orifice or opening

______r. Outward growth from a mucous membrane

2. Match endoscopic procedure commonly used in gastrointestinal surgery on the right with the correct descriptions.

______a. Examination of the common bile duct

______b. Examination of the walls of the stomach and removal of tissue specimens, if desired

______c. Examination of the esophagus

______d. Examination of the entire colon from anus to ileocecal valve and removal of polyps and tissue specimens, if desired

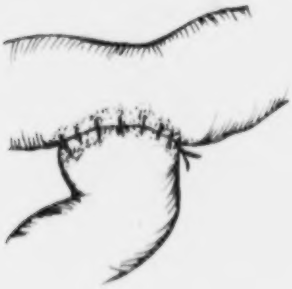
______e. Examination of the sigmoid colon and rectum and removal of polyps and tissue specimens, if desired

______f. Examination of the mucosa of the anal canal

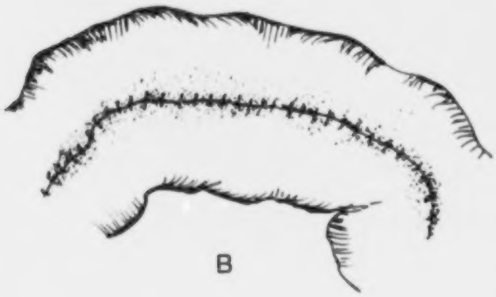
1. Anoscopy
2. Choledochoscopy
3. Colonoscopy
4. Esophagogastroduodenoscopy
5. Esophagoscopy
6. Gastroscopy
7. Proctoscopy
8. Sigmoidoscopy

Written Test

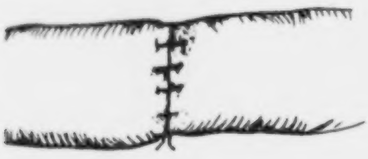
3. Identify the three types of anastomoses, and place your answers in the blanks provided.



A



B



C

a. ______________________________

b. ______________________________

c. ______________________________

4. Complete the following statements concerning operations on the biliary tract by circling the correct answers.

   a. (Cholecystotomy, Choledochotomy) — Establishment of an opening into the gallbladder to permit drainage of the organ and removal of stones

   b. (Cholecystectomy, Choledochotomy) — Incision of the common bile duct for exploration and removal of stones

   c. Cholecystojejunostomy — Anastomosis between the gallbladder and the (duodenum, jejunum)

   d. (Cholecystectomy, Choledochectomy) — Removal of the gallbladder

Written Test

e. Choledochoduodenostomy — Side-to-side or end-to-side anastomosis between the duodenum and the (common bile duct, gallbladder)

f. Transduodenal sphincterotomy — Partial division of the sphincter of (Oddi, Vater) and exploration of the distal end of the common bile duct

5. List three indications for biliary tract surgery.

a. ______________________________

b. ______________________________

c. ______________________________

6. Complete the following statements concerning the procedure for a cholecystectomy with operative cholangiogram by circling the correct answers.

a. Patient is placed in the supine position with a small pad or gallbladder lift placed under the (left, right) upper quadrant and is prepped and draped.

b. Prior to surgeon entering room, technologist prepares dye and (angiogram, cholangiogram) catheter.

c. Surgeon enters abdomen with a right (midabdominal transverse, subcostal) or right paramedian incision.

d. Retractors and (laparotomy sponges, 4 × 4s) are used as surgeon examines abdominal cavity.

e. If gallbladder is greatly distended, surgeon may (irrigate, drain) it of bile with a trocar connected to suction.

f. When finished, surgeon passes trocar to technologist who places it (in a basin, on the Mayo).

g. Surgeon identifies the cystic duct, cystic artery, and the (hepatic, common bile) duct.

h. Using right-angle clamps, surgeon clamps and ligates the cystic duct, and then double clamps and ligates the cystic artery. Surgeon then makes small incision in top of (cystic duct, cystic artery).

i. Technologist passes syringe, catheter, and its attaching (needle, clamp) to the surgeon.

Written Test

j. Surgeon threads the tip of the catheter through the opening in the (common bile, cystic) duct and may tie it in place.

k. (Surgeon, Technologist) injects the dye and x-rays are taken.

l. If no stones are shown, surgeon continues with cholecystectomy. If stones are found, surgeon explores common bile duct and removes stones with a variety of (scoops, curettes), and technologist receives stones as specimens.

m. Surgeon dissects gallbladder from the undersurface of the (spleen, liver) with Metzenbaum scissors and right-angle clamps until it is mobilized, and passes specimen to technologist.

n. Wound is irrigated with warm (glycine, saline) solution, and operative site is examined for small bleeders.

o. Surgeon positions drain in the wound if desired and brings out through (the wound, a stab incision), and then closes wound.

7. Arrange in order the procedure for a laparoscopic cholecystectomy by placing the correct sequence numbers (1-9) in the appropriate blanks.

______a. Three or four trocars are introduced into the abdomen at selected sites.

______b. Cystic artery and cystic duct are clipped and ligated with scissors or a laser (such as argon, KTP, or Nd:YAG).

______c. Gallbladder is dissected free from the liver bed using laser or electrocautery. It may be cut into sections for removal or delivered from the wound in a retrieval bag.

______d. Patient is placed in the supine position and is prepped and draped.

______e. Wounds are closed in routine manner, and dressings are placed over each puncture site.

___5___f. The peritoneum is dissected from the gallbladder, exposing the cystic artery, the cystic duct, and the common bile duct.

______g. The gallbladder is grasped and retracted superiorly.

______h. Area is irrigated and checked for hemostasis. All instruments are removed and the pneumoperitoneum is released.

______i. Pneumoperitoneum is established using an insufflation needle.

Written Test

8. Match operations on the liver, spleen, and pancreas on the right with the correct descriptions.

______a. Small wedge or needle biopsy, simple tumor excision, or major lobectomy for hepatic disease diagnosis, metastatic or primary carcinoma, or severe laceration of the liver

______b. Removal of the spleen for hypersplenism, traumatic ruptures, tumors, or accessory spleens

______c. Radical removal of the head of the pancreas, the entire duodenum, a portion of the jejunum, the distal third of the stomach, and the lower half of the common bile duct, with the reestablishment of continuity of the biliary, pancreatic, and gastrointestinal tract systems for carcinoma of the head of the pancreas or ampulla of Vater

______d. Anastomosis of a loop of the jejunum to the pancreatic duct for chronic alcoholic pancreatitis and pseudocysts of the pancreas

______e. Transfer of organ from donor to recipient primarily for patients with serious secondary diabetic complications

1. Drainage of intrahepatic, subhepatic, or subphrenic abscess
2. Hepatic resection
3. Liver transplant
4. Pancreas transplant
5. Pancreaticoduodenectomy (Whipple)
6. Pancreaticojejunostomy
7. Splenectomy

9. Complete the following statements concerning special bowel techniques used during intestinal surgery by filling in the blanks with the correct answers.

a. Special bowel techniques are used when the ____________________ tract is entered during a surgical procedure.

b. It is the ____________________'s perogative to determine the area to be considered contaminated and the extent of bowel technique to be carried out.

c. When dealing with an intestinal obstruction, despite its location, the area is considered ____________________ due to stasis of activity.

d. For most procedures in contaminated areas, it is necessary to isolate the area of anastomosis with __________________ to restrict any possibility of spillage.

e. All items that come in contact with gastrointestinal secretions are contaminated and should be isolated in a __________________ from rest of field and **not** __________________ again.

f. Extent of bowel technique used by surgeon depends on __________________

____.

g. Many surgeons desire a new set of instruments, new irrigation solution, additional draping materials, as well as a change of __________________ .

h. One responsibility of the scrub person during bowel technique is _____________

____.

i. The "ideal" concept uses __________________ scrub persons.

10. Distinguish between the two basic bowel techniques by placing a "C" for clean closure technique and a "D" for drop technique next to the correct descriptions.

______a. If an item is needed from the Mayo while bowel technique is being used, the tips of the transfer forceps are used to pick up and drop the item on the work surface.

______b. All items used during bowel technique are placed in a single basin that is passed to the circulator.

______c. Uses two Mayo stands—One for intestinal resection, the other for closure

______d. Uses fewer instruments and furniture

______e. Provides a greater margin of safety

______f. After anastomosis is complete, circulator removes back table and Mayo with the contaminated items.

______g. After the bowel is closed, gloves and/or gowns are changed, and the incisional area is redraped.

______h. The second Mayo is used for routine closure.

Written Test

11. Match gastric procedures on the right with the correct descriptions.

______a. Incision through pyloric muscle to release a stenosis

______b. Excision of entire stomach and anastomosis between a loop of the jejunum and the esophagus; usually performed for malignancy

______c. Subtotal gastrectomy and gastroduodenostomy in which the remaining portion of the stomach is anastomosed to the duodenum

______d. Creation of a small proximal gastric pouch by stapling, with bypass of the distal end of the stomach by a gastrojejunostomy

______e. Resection of portions of the vagus nerve near the stomach at the level of the esophagus in order to decrease the amount of gastric juices; performed in conjunction with a gastric resection or pyloroplasty

1. Billroth I
2. Billroth II
3. Gastric bypass
4. Gastrotomy
5. Percutaneous endoscopic gastrostomy
6. Pyloromyotomy
7. Pyloroplasty
8. Total gastrectomy
9. Vagotomy

12. Arrange in order the procedure for a Billroth II by placing the correct sequence numbers (1-12) in the appropriate blanks.

__6__a. Surgeon begins gastrojejunal anastomosis by aligning the stomach and jejunum at the proposed junction site, and places traction sutures at each end of the site to hold them in alignment.

______b. Surgeon makes an incision to expose the inner surface of the jejunum.

______c. Surgeon resects the duodenum, and places two intestinal clamps across the duodenum.

______d. Surgeon cross clamps the stomach and resects diseased portion.

______e. Surgeon enters abdomen through upper midline incision, examines extent of disease in abdomen, and chooses a site for anastomosis.

Written Test

_______f. Surgeon closes wound.

__9__g. Surgeon joins inner mucosal surfaces of stomach and jejunum with continuous absorbable suture.

_______h. Surgeon divides the duodenum from the stomach by cutting between the two clamps with knife or electrosurgical pencil, and closes duodenal stump with running suture on a GI needle.

_______i. Surgeon forms first row of sutures on lower serosa using interrupted nonabsorbable suture swaged on a GI needle.

_______j. Surgeon joins upper serosal membranes of jejunum and stomach with interrupted nonabsorbable suture.

_______k. Surgeon irrigates wound with warm saline solution.

_______l. Surgeon mobilizes the stomach from the ligaments, vessels, and omentum attaching to the greater and lesser curvatures.

13. Arrange in order the procedure for a pyloromyotomy by placing the correct sequence numbers (1-6) in the appropriate blanks.

_______a. Surgeon separates the circular muscle fibers to the depth of the inner mucosa using a pyloric spreader.

_______b. Surgeon identifies pylorus and makes an incision into the pylorus over the defect.

_______c. Surgeon closes wound with fine sutures.

_______d. Surgeon enters abdomen through a right upper paramedian incision.

_______e. Surgeon deepens incision with a fine Kelly clamp.

_______f. Surgeon may insert a baby Balfour retractor, or have assistance retract abdominal walls with small hand-held retractors.

Written Test

14. Match the operations on the intestine on the right with the correct descriptions.

______a. Removal of the diverticulum attached to the distal ileum and establishment of bowel continuity

______b. Diseased part of intestine is excised, and suitable anastomosis is completed

______c. Diseased part of colon is excised, and anastomosis is performed

______d. Anastomosis of the proximal jejunum end-to-end to the distal ileum primarily to treat morbidly obese patients

______e. Removal of the entire colon

______f. Externalization through the abdominal wall of the proximal end of the transected ileum; performed in conjunction with a total colectomy

______g. Surgically created opening (stoma) from some portion of the colon to the exterior through the abdominal wall

1. Appendectomy
2. Colectomy
3. Colon resection
4. Colostomy
5. Hemicolectomy
6. Ileostomy
7. Jejunoileal bypass
8. Meckels' diverticulectomy
9. Small intestine resection

15. List five indications for resections of the small and large intestines.

a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________

Written Test

16. Arrange in order the procedure for resection of a small intestine by placing the correct sequence numbers (1-7) in the appropriate blanks.

_____a. Adequate patency of the anastomosis is checked.

_____b. Clamps are placed above and below the isolated segment, the segment is removed with cautery or knife, and is passed to the technologist as a specimen.

_____c. Mesentery is dissected away from the intestine with tissue and vessels tied off as needed until the diseased portion and anastomosis area are isolated.

_____d. Abdominal wall is incised and retracted.

_____e. Wound is closed and dressed.

_____f. Continuity of the gastrointestinal tract is established by a suitable anastomosis.

_____g. Intestine is examined to identify the diseased portions or problem areas and to decide upon the area that needs to be removed or corrected.

17. Complete the following statements concerning the procedure for an appendectomy by filling in the blanks with the correct answers.

a. Surgeon enters abdomen through a _______________ incision.

b. _______________ retracts wound edges with a Richardson or similar retractor.

c. _______________ grasps appendix with Babcock clamps and delivers it into the wound site.

d. A moist lap sponge is placed around the base of the appendix to prevent contamination of the wound with _______________ contents.

e. Surgeon _______________ the appendix from its attachments to the bowel.

f. _______________ of appendix is grasped with a straight clamp.

g. Clamp is removed and surgeon _______________ the base of the appendix in groove left by clamp.

Written Test

h. Surgeon places __________________ suture around the appendix.

i. Surgeon places clamp distal to ligature, __________________ the appendix, and delivers it to the dirty basin.

j. Surgeon or assistant __________________ the appendix stump into the cecum, and surgeon ties the suture.

k. Instruments are discarded into the __________________, wound is irrigated, and abdomen is closed.

18. Arrange in order the procedure for a laparoscopic appendectomy by placing the correct sequence numbers (1-9) in the appropriate blanks.

______a. Three or four trocars are placed in selected sites in the abdomen.

______b. Pneumoperitoneum is established using an insufflation needle.

______c. Area is irrigated and checked for hemostasis. All instruments are removed, and the pneumoperitoneum is released.

______d. Wounds are closed in routine manner, and dressings are placed over each puncture site.

______e. Surgeon cauterizes the appendiceal stump.

______f. Patient is placed in the supine position and is prepped and draped.

______g. The appendix is grasped and divided from the mesoappendix using electrosurgical unit.

______h. Surgeon dissects the appendix free and delivers it from the wound through a trocar port. A retrieval bag may be used.

__*5*__i. Surgeon applies suture ligatures to base of appendix.

19. Complete the following statements concerning characteristics of abdominoperineal resection by circling the correct answers.

a. Through combined abdominal and perineal incisions, the (appendix, anus), rectum, and sigmoid colon are removed en bloc.

b. Procedure is performed to treat cancer of the lower (rectum, abdomen).

c. Procedure necessitates the formation of a (temporary, permanent) colostomy in the abdominal wall for drainage of bowel contents.

d. When procedure is performed as two simultaneous procedures, patient is placed in a modified (supine, lithotomy) position.

e. As part of the abdominal team, technologist stands (slightly behind, next to) the assistant and must take special care to avoid contamination.

f. As part of the lower team, technologist stands (slightly behind, next to) the surgeon.

g. Procedure requires laparotomy short and long sets and (gastric, intestinal) set, plus a colostomy bag.

20. Match operations on the anorectal region on the right with the correct descriptions.

______a. Excision and ligation of dilated varicosities of the veins of the anus and rectum to relieve discomfort and to control bleeding

______b. Excision of tissue surrounding a fistula-in-ano to expose healthy tissue around the fistula so the tract can heal

______c. Dilation and excision of benign lesions of the sinus tract in the sacrococcygeal region

______d. Excision of the cyst with sinus tracts in the sacrococcygeal region

1. Fissurectomy
2. Excision of pilonidal cyst and sinus
3. Hemorrhoidectomy
4. Fistulectomy

21. Arrange in order the procedure for a hemorrhoidectomy by placing the correct sequence numbers (1-8) in the appropriate blanks.

______a. Surgeon dresses the anus with antibiotic or antiseptic packing.

______b. Surgeon slowly dilates the rectum with a lubricated rectal dilator.

______c. Surgeon removes other hemorrhoids in similar manner.

______d. Surgeon inserts a rectal speculum.

______e. Surgeon amputates the vessel, excising a small amount of rectal mucosa at the same time with a knife or electrosurgical pencil.

______f. Patient is placed in the Kraske (jackknife) or lithotomy position, circulator tapes the buttocks apart by placing 4-inch adhesive tape on each side of the anus and attaching the ends to the operating table frame, and patient is prepped with minimal scrub prep.

______g. Surgeon grasps hemorrhoid with a Pennington or Allis clamp.

______h. Surgeon ligates the vein with suture on a fine needle.

22. List three specialized instruments for each of the following categories.

a. Gallbladder instruments

(1) ______________________________

(2) ______________________________

(3) ______________________________

b. Gastrointestinal instruments

(1) ______________________________

(2) ______________________________

(3) ______________________________

c. Rectal instruments

(1) ______________________________

(2) ______________________________

(3) ______________________________

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*Permission to duplicate this test is granted.

Gastrointestinal Surgery
Unit 4

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Gastrointestinal Surgery Cases Rating _____

Comments: ____

____

Written Test Scores .

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

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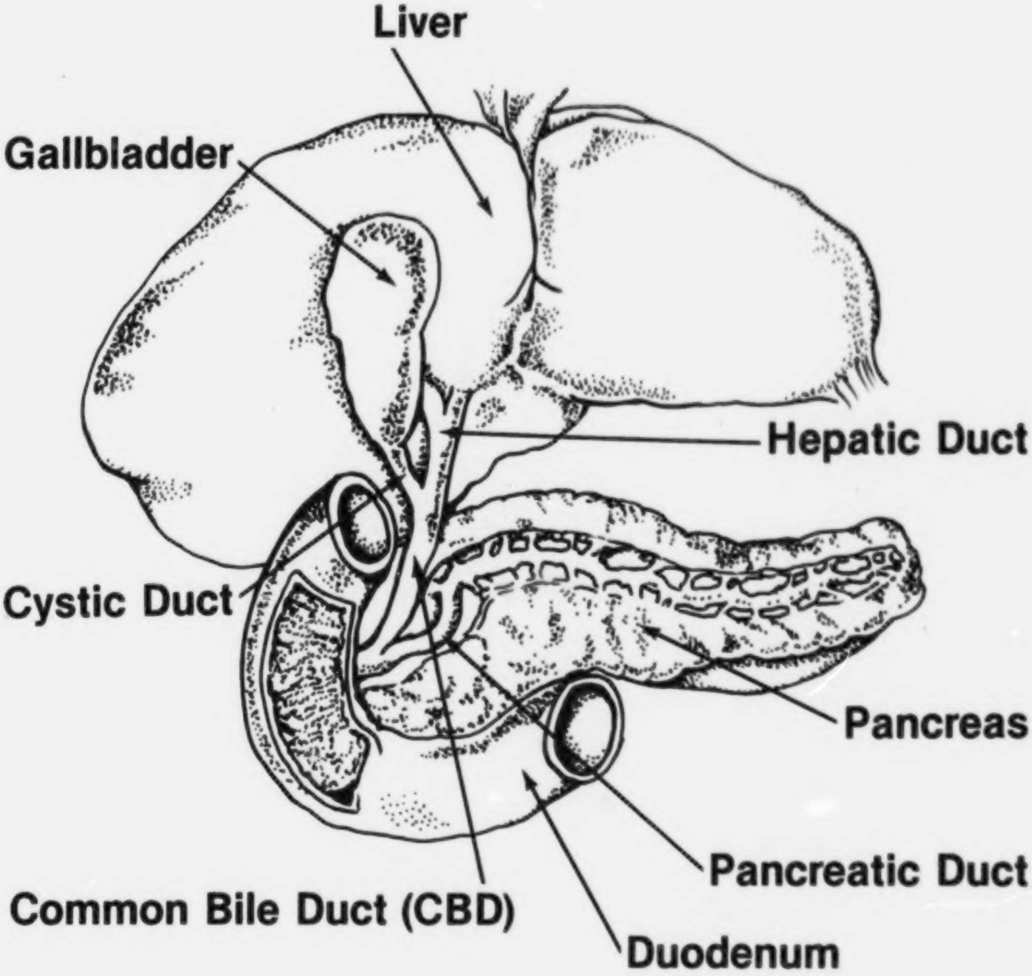
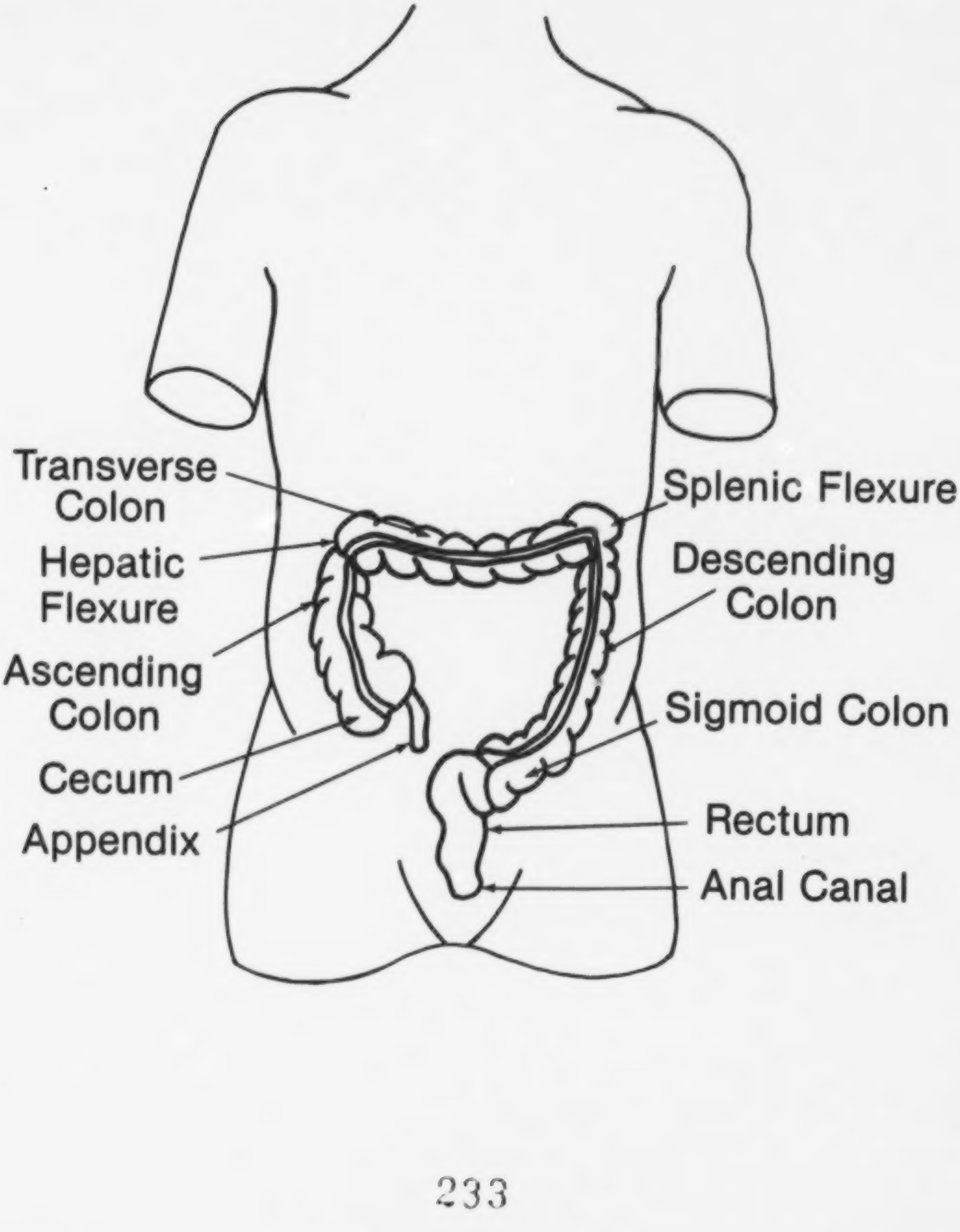
*Permission to duplicate this form is granted.

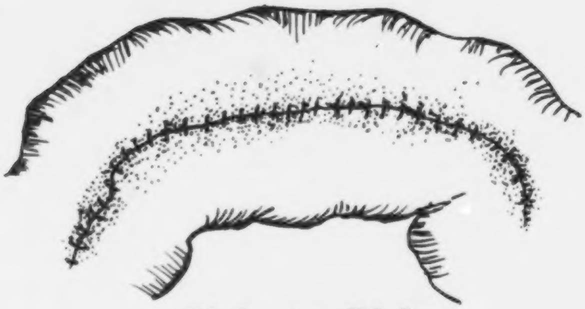
The Biliary System


Liver
Gallbladder
Hepatic Duct
Cystic Duct
Pancreas
Pancreatic Duct
Common Bile Duct (CBD)
Duodenum

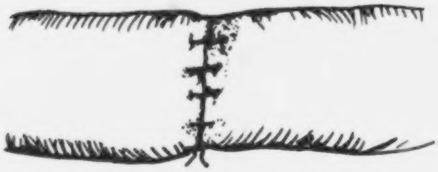
Parts of the Large Intestine (Colon)


Transverse Colon
Hepatic Flexure
Ascending Colon
Cecum
Appendix
Splenic Flexure
Descending Colon
Sigmoid Colon
Rectum
Anal Canal

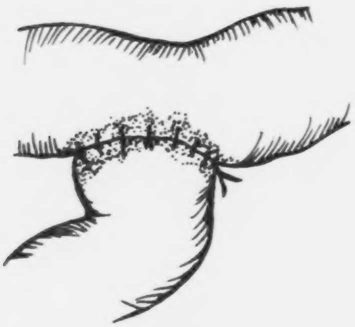
Types of Anastomoses



Side-to-Side

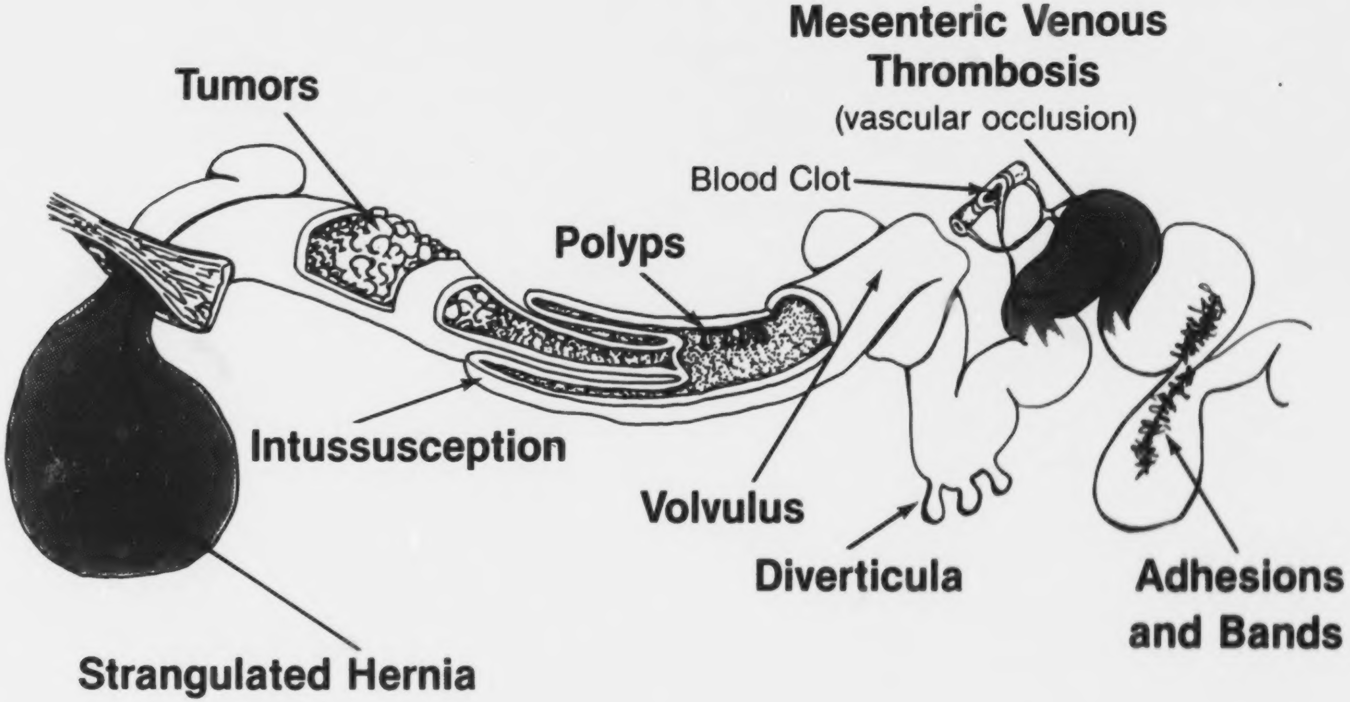


End-to-End



End-to-Side

Intestinal Conditions


Tumors
Mesenteric Venous Thrombosis
(vascular occlusion)
Blood Clot
Polyps
Intussusception
Volvulus
Diverticula
Adhesions and Bands
Strangulated Hernia

Surgical Procedures, Unit 4
Teacher Page 39

TM 4

Gastrointestinal Surgery
Unit 4

Information Sheet

1. **Terms and definitions**

   a. **Adhesion** — Holding together by new tissue, produced by inflammation or injury, of two structures that are normally separate

   b. **Anastomosis** — Union of parts or branches so as to intercommunicate

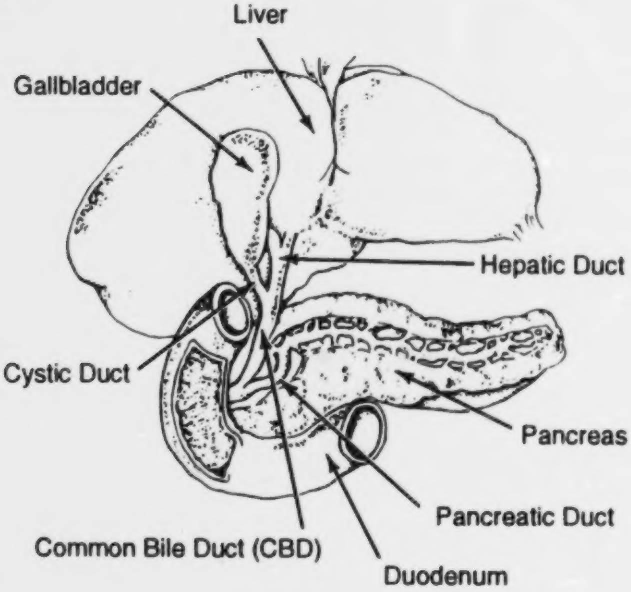
   c. **Atresia** — Imperforation or closure of a normal tubular opening of the body

   Examples: Biliary atresia, esophageal atresia

   d. **Bile** — Yellow or greenish viscid alkaline fluid secreted by the liver which aids in the digestion and absorption of fats

   e. **Biliary tract** — System of body parts conveying bile

   Figure 1


Liver
Gallbladder
Hepatic Duct
Cystic Duct
Pancreas
Pancreatic Duct
Common Bile Duct (CBD)
Duodenum

   f. **Cholangiogram** — Injection of radiopaque (contrast media) solution into the cystic duct or into a tube placed in the common bile duct to permit x-ray identification of the biliary ductal system

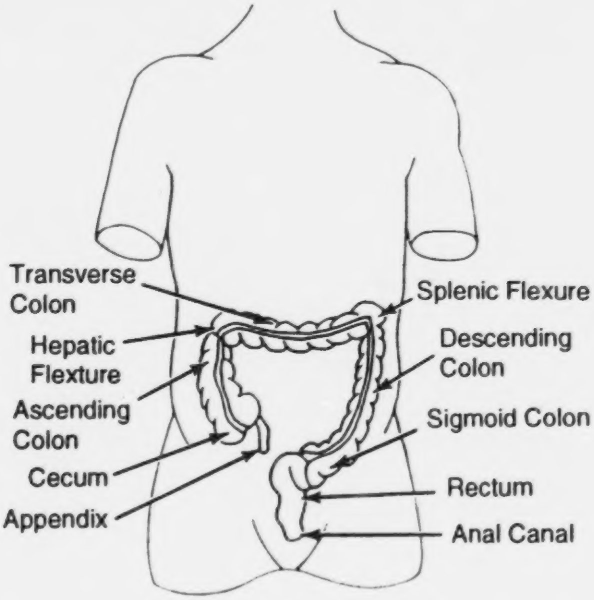
   g. **Cholecystitis** — Inflammation of the gallbladder

Information Sheet

h. **Cholelithiasis** — Presence of stones in the gallbladder

i. **Colon** — Large intestine extending from the end of the ileum (small intestine) to the rectum; divided into several sections

Figure 2


Transverse Colon
Splenic Flexure
Hepatic Flexture
Descending Colon
Ascending Colon
Sigmoid Colon
Cecum
Rectum
Appendix
Anal Canal

j. **Diverticula** — Small, blind pouches that form in the lining and wall of a canal or organ, especially the colon

k. **Dysphagia** — Difficulty in swallowing

l. **Fissure** — Narrow opening or crack of considerable length and depth

m. **Fistula** — Abnormal passage leading from an abscess or hollow organ to the body surface or from one hollow organ to another

n. **Intussusception** — Invagination of proximal intestine into the lumen of the distal intestine causing intestinal obstruction

o. **Meckel's diverticulum** — Pouch caused by continued existence of the omphalomesenteric duct located on the ileum close to the ileocecal valve

p. **Mucosa** — Mucous membrane

q. **Peptic ulcer** — Ulcer consisting of localized destruction of tissue on the mucous membrane in the duodenum or stomach

Information Sheet

r. **Peritonitis** — Inflammation of the peritoneal cavity

s. **Polyp** — Outward growth from a mucous membrane

t. **Pyloric stenosis** — Congenital abnormality resulting in the narrowing of the opening between the stomach and the duodenum

u. **Resection** — Partial excision of a structure and reconstruction of the remaining parts

v. **Sphincter** — Ring-like muscle that closes a natural orifice or opening

w. **Volvulus** — Torsion of a loop of intestine causing obstruction (with or without strangulation)

2. **Endoscopic procedures commonly used in gastrointestinal surgery**

a. **Anoscopy** — Examination of the mucosa of the anal canal

b. **Choledochoscopy** — Examination of the common bile duct

c. **Colonoscopy** — Examination of the entire colon from anus to ileocecal valve and removal of polyps and tissue specimens, if desired

d. **Esophagogastroduodenoscopy (EGD)** — Examination of the esophagus, stomach, and duodenum and removal of tissue specimens, if desired

e. **Esophagoscopy** — Examination of the esophagus

f. **Gastroscopy** — Examination of the walls of the stomach and removal of tissue specimens, if desired

g. **Proctoscopy** — Examination of the mucosa of the rectum and anal canal

h. **Sigmoidoscopy** — Examination of the sigmoid colon and rectum and removal of polyps and tissue specimens, if desired

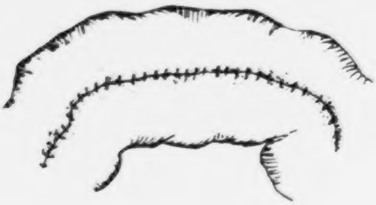
Information Sheet

3. Types of anastomoses

Note: The type of anastomosis to be used is based on the surgeon's preference, patient's condition, and location of problem.

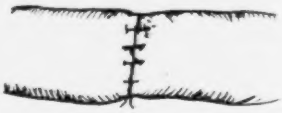
a. Side-to-side

Figure 3



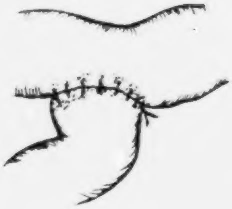
b. End-to-end

Figure 4



c. End-to-side

Figure 5



Information Sheet

4. Operations on the biliary tract

a. **Cholecystectomy** — Removal of the gallbladder

Note: An operative cholangiogram is frequently done intraoperatively in combination with a cholecystectomy or other biliary tract operations to permit x-ray identification of stones in the biliary system.

b. **Cholecystotomy** — Establishment of an opening into the gallbladder to permit drainage of the organ and removal of stones

c. **Choledochotomy** — Incision of the common bile duct for exploration and removal of stones

d. **Cholecystoduodenostomy** — Anastomosis between the gallbladder and the duodenum

e. **Cholecystojejunostomy** — Anastomosis between the gallbladder and the jejunum

f. **Choledochoduodenostomy** —Side-to-side or end-to-side anastomosis between the duodenum and the common bile duct

g. **Choledochojejunostomy (Roux-Y)** — Side-to-side or end-to-side anastomosis between the jejunum and the common bile duct

h. **Transduodenal sphincterotomy** — Partial division of the sphincter of Oddi and exploration of the distal end of the common bile duct

Note: This is to treat recurrent attacks of acute pancreatitis due to the formation of calculi in the pancreatic duct or blockage of the sphincter of Oddi.

5. Indications for biliary tract surgery

a. Acute or chronic cholecystitis

b. Cholelithiasis

c. Carcinoma

d. Biliary atresia

e. Obstruction in the common bile duct

Information Sheet

6. Procedure for a cholecystectomy with operative cholangiogram

a. Patient is placed in the supine position with a small pad or gallbladder lift placed under the right upper quadrant and is prepped and draped.

b. Prior to surgeon entering room, technologist prepares dye and cholangiogram catheter.

Note: Make sure that all air bubbles are removed from the syringe and the catheter since they will appear as stones on the x-ray. The catheter may be clamped so no air will enter.

c. Surgeon enters abdomen with a right subcostal or right paramedian incision.

d. Retractors and laparotomy sponges are used as surgeon examines abdominal cavity.

e. If gallbladder is greatly distended, surgeon may drain it of bile with a trocar connected to suction.

f. When finished, surgeon passes trocar to technologist who places it in a basin.

Note: This basin will receive all instruments contaminated with bile.

g. Surgeon identifies the cystic duct, cystic artery, and the common bile duct.

h. Surgeon separates common bile duct from the nearby structures in preparation for the cholangiogram.

i. Using right-angle clamps, surgeon clamps and ligates the cystic duct with a nonabsorbable ligature clip or tie, and then double clamps and ligates the cystic artery. Surgeon then makes small incision in top of cystic duct.

j. Technologist passes syringe, catheter, and its attaching clamp to the surgeon.

k. Surgeon threads the tip of the catheter through the opening in the cystic duct and may tie it in place.

Note: Instruments and radiopaque sponges will need to be removed so they will not interfere with the x-ray. The wound should be protected with a towel from contamination from the overhead x-ray machine.

l. Surgeon injects the dye and x-rays are taken.

Information Sheet

m. If no stones are shown, surgeon removes the catheter, ligates the distal end of the cystic duct, and continues with cholecystectomy as outlined in step n. If stones are found, surgeon explores common bile duct and removes stones with a variety of forceps, scoops, and probes, and technologist receives stones as specimens.

Note: Additional films may be taken to ensure that all stones have been removed and the duct is patent. At this point the cholangiogram part of the procedure is complete and the cholecystectomy is continued.

n. Surgeon dissects gallbladder from the undersurface of the liver with Metzenbaum scissors and right-angle clamps until it is mobilized.

o. Surgeon passes specimen to technologist. The raw surface of the liver where the gallbladder was may be closed or cauterized.

p. Wound is irrigated with warm saline solution, and operative site is examined for small bleeders.

q. Surgeon positions drain in the wound if desired and brings out through a stab incision.

r. Surgeon closes the wound.

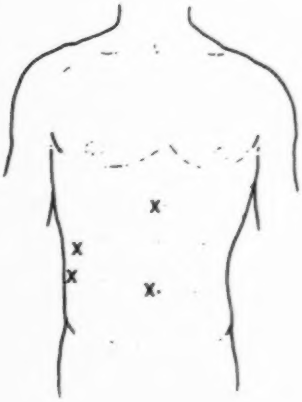
7. Procedure for a laparoscopic cholecystectomy

a. Patient is placed in the supine position and is prepped and draped.

b. Pneumoperitoneum is established using an insufflation needle.

c. Three or four trocars are introduced into the abdomen at selected sites.

Figure 6—Possible trocar sites



Information Sheet

d. The gallbladder is grasped and retracted superiorly.

e. The peritoneum is dissected from the gallbladder, exposing the cystic artery, the cystic duct, and the common bile duct.

f. Cystic artery and cystic duct are clipped and ligated with scissors or a laser (such as argon, KTP, or Nd:YAG).

Note: An operative cholangiogram may be done at this point.

g. Gallbladder is dissected free from the liver bed using laser or electrocautery. It may be cut into sections for removal or delivered from the wound in a retrieval bag.

h. Area is irrigated and checked for hemostasis. All instruments are removed and the pneumoperitoneum is released.

i. Wounds are closed in routine manner, and dressings are placed over each puncture site.

8. Operations on the liver, spleen, and pancreas and descriptions

a. **Drainage of intrahepatic, subhepatic, or subphrenic abscess** — Drainage of abscesses of the liver

b. **Hepatic resection** — Small wedge or needle biopsy, simple tumor excision, or major lobectomy for hepatic disease diagnosis, metastatic or primary carcinoma, or severe laceration of the liver

c. **Liver transplant** — Transfer of liver organ from donor to recipient primarily for patients whose life is threatened or seriously compromised by liver disease (usually cirrhosis)

d. **Splenectomy** — Removal of the spleen for hypersplenism, traumatic ruptures, tumors, or accessory spleens

Note: This is also performed as a staging procedure for Hodgkins.

e. **Pancreaticojejunostomy** — Anastomosis of a loop of the jejunum to the pancreatic duct for chronic alcoholic pancreatitis and pseudocysts of the pancreas

f. **Pancreaticoduodenectomy** (Whipple operation) — Radical removal of the head of the pancreas, the entire duodenum, a portion of the jejunum, the distal third of the stomach, and the lower half of the common bile duct, with the reestablishment of continuity of the biliary, pancreatic, and gastrointestinal tract systems for carcinoma of the head of the pancreas or ampulla of Vater

Information Sheet

g. **Pancreas transplant** — Transfer of pancreas organ from donor to recipient primarily for patients with serious secondary diabetic complications (such as retinopathy or nephropathy)

9. Special bowel techniques used during intestinal surgery

a. Special bowel techniques are used when the intestinal tract is entered during a surgical procedure.

Note: There are varied opinions as to which areas are contaminated. Most agree that one contaminated area is from the cecum to the anus. The area from the stomach to jejunum, due to high acid content, has low bacterial count which renders it a cleaner area.

b. It is the surgeon's perogative to determine the area to be considered contaminated and the extent of bowel technique to be carried out.

Note: Check the surgeon's preference card or ask the surgeon prior to beginning the case to eliminate confusion when it is time to institute the bowel technique and when to conclude the technique.

c. When dealing with an intestinal obstruction, despite its location, the area is considered contaminated due to stasis of activity.

d. For most procedures in contaminated areas, it is necessary to isolate the area of anastomosis with laparotomy sponges (tapes) or drapes, or both to restrict any possibility of spillage.

Caution: All items that come in contact with gastrointestinal secretions are contaminated and should be isolated in a separate basin from rest of field and not handled again.

e. Extent of bowel technique used by surgeon depends on:

(1) Adequacy of bowel preparation

(2) Physical condition of the patient

(3) Adequacy of blood supply to area of anastomosis

(4) Viability of tissues

f. Many surgeons desire a new set of instruments, new irrigation solution, additional draping materials, as well as a change of gloves and/or gown and gloves.

Information Sheet

g. Scrub person's responsibilities include:

  (1) To isolate contaminated instruments and drapes

  (2) To provide sterile instruments, gowns, gloves, and drapes after anastomosis prior to closure

h. The "ideal" concept uses two scrub persons.

  (1) One to assist the team from the Mayo tray

  (2) The other to remain with the instrument table and be the "sterile" team member

Note: This is not always feasible.

i. There are several ways to perform bowel technique. The following are two examples:

  (1) Drop technique or "no touch" with transfer forceps

  (2) Clean closure technique with two Mayo setups

j. Actual procedures vary with institutions and surgeons.

10. Characteristics of two basic bowel techniques

a. Drop technique

  (1) This technique uses fewer instruments and furniture than the clean closure technique.

  (2) During the initial setup, the instruments, drapes, sutures, and sponges to be used for the anastomosis are separated on the sterile field from the other sterile items.

  (3) Transfer forceps are placed on the back table or Mayo stand with the handles extending over the table edge and the tips of the forceps secured under a rolled or weighted towel.

  (4) When the transection of the gastrointestinal tract is imminent, extra drapes are placed on the lower portion of the sterile field to cover the area to be used as the work surface. Items needed during resection and primary closure of the anastomosis are placed on this surface.

Information Sheet

(5) If an item is needed from the back table or Mayo while bowel technique is being used, the tips of the forceps are used to pick up the item and lightly drop it on the work surface.

Note: Take care not to touch the forcep tip or handles to the operative field.

(6) Before or after the last row of reinforcing sutures is placed, surgeon irrigates the wound and then discards laparotomy sponges, retractors, and other instruments according to hospital policy, usually in a single basin that is passed to the circulator.

Caution: Any item that comes in direct contact with the divided bowel is contaminated and must be discarded from the sterile field.

(7) Gloves and/or gowns are changed, and the incisional area is redraped. Wound is irrigated.

(8) The uncontaminated Mayo and back table are used for routine closure.

b. **Clean closure technique**

(1) This technique provides a greater margin of safety than the drop technique.

(2) It uses two Mayo stands.

(a) One Mayo is used for intestinal resection and discarded after continuity of intestinal canal is restored.

(b) Second Mayo holds clean closure setup with instruments, suture, and sponges for closing abdominal cavity and wall.

(3) After initial counts are made, the clean closure Mayo is placed on the periphery of the surgical field to be used later.

Caution: Do not touch anything on the clean closure Mayo after case is started.

(4) Before or after the last row of reinforcing sutures is placed in the anastomosis, the circulator removes the back table and first Mayo with the contaminated instruments, supplies, drapes, and specimens.

(5) Gloves and/or gowns are changed and the incisional area is redraped. Wound is irrigated.

(6) The clean closure Mayo is used for routine closure.

11. Gastric procedures and their descriptions

a. **Gastrotomy** — Incision into anterior stomach wall with exploration of the interior

b. **Total gastrectomy** — Excision of entire stomach and anastomosis between a loop of the jejunum and the esophagus; usually performed for malignancy

c. **Subtotal or partial gastrectomy** — Removal of the lower half to two-thirds of the stomach; continuity is reestablished by several methods

   (1) **Billroth I** — Subtotal gastrectomy and gastroduodenostomy in which the remaining portion of the stomach is anastomosed to the duodenum

   (2) **Billroth II** — Subtotal gastrectomy and gastrojejunostomy in which the remaining portion of the stomach is anastomosed to the jejunum

   Note: There are several modifications of both the Billroth I and II which involve various techniques of anastomosis.

d. **Percutaneous endoscopic gastrostomy (PEG)** — Insertion of a catheter (feeding tube) into the stomach with the aid of a fiberoptic gastroscope

e. **Pyloromyotomy** — Incision through pyloric muscle to release a stenosis

Note: This is commonly done to correct pyloric stenosis.

f. **Pyloroplasty** — Enlargement of the pyloric opening

g. **Gastric bypass** — Creation of a small proximal gastric pouch by stapling, with bypass of the distal end of the stomach by a gastrojejunostomy

h. **Vagotomy** — Resection of portions of the vagus nerve near the stomach at the level of the esophagus in order to decrease the amount of gastric juices; performed in conjunction with a gastric resection or pyloroplasty

Note: A vagotomy increases the presence of pylorospasm.

Information Sheet

12. Procedure for a Billroth II (subtotal gastrectomy with gastrojejunostomy)

a. Surgeon enters abdomen through upper midline incision, examines extent of disease in abdomen, and chooses a site for anastomosis.

b. Surgeon mobilizes the stomach from the ligaments, vessels, and omentum attaching to the greater and lesser curvatures.

Note: The technologist must be ready to pass numerous clamps, scissors, and ties, as well as suture ligatures on GI needles or stapling devices as required.

c. Surgeon resects the duodenum, and places two intestinal clamps (such as Allen or Dennis) across the duodenum.

d. Surgeon divides the duodenum from the stomach by cutting between the two clamps with knife or electrosurgical pencil, and closes duodenal stump with running suture on a GI needle.

Note: Use of stapling devices will modify this procedure somewhat.

e. Surgeon uses intestinal instruments to cross clamp the stomach and resects diseased portion.

f. Surgeon begins gastrojejunal anastomosis by aligning the stomach and jejunum at the proposed junction site, and places traction sutures at each end of the site to hold them in alignment.

g. Surgeon forms first row of sutures on lower serosa using interrupted nonabsorbable suture swaged on a GI needle.

h. Surgeon makes an incision to expose the inner surface of the jejunum.

i. Surgeon joins inner mucosal surfaces of stomach and jejunum with continuous absorbable suture.

j. Surgeon joins upper serosal membranes of jejunum and stomach with interrupted nonabsorbable suture.

Note: Surgeon may use stapling instruments instead of sutures.

k. Surgeon irrigates wound with warm saline solution.

l. Surgeon closes wound.

Information Sheet

13. Procedure for a pyloromyotomy

Note: This is usually performed on newborns or young infants.

a. Surgeon enters abdomen through a right upper paramedian incision.

b. Surgeon may insert a baby Balfour retractor, or have assistant retract abdominal walls with small hand-held retractors.

c. Surgeon identifies pylorus and makes an incision into the pylorus over the defect.

Note: Hemostasis is maintained with the electrosurgical pencil on a very low setting.

d. Surgeon deepens incision with a fine Kelly clamp.

e. Surgeon separates the circular muscle fibers to the depth of the inner mucosa using a pyloric spreader.

Note: This releases the stricture. The incisions are left to heal in their newly released position.

f. Surgeon closes wound with fine sutures.

14. Operations on the intestine and descriptions

a. **Small intestine resection** — Diseased part of intestine is excised, and suitable anastomosis is completed

b. **Colon resection** — Diseased part of colon is excised, and anastomosis is performed

c. **Jejunoileal bypass** — Anastomosis of the proximal jejunum end-to-end to the distal ileum primarily to treat morbidly obese patients

d. **Colectomy** — Removal of the entire colon

e. **Hemicolectomy** — Removal of half of the colon

f. **Ileostomy** — Externalization through the abdominal wall of the proximal end of the transected ileum; performed in conjunction with a total colectomy

Information Sheet

g. **Colostomy** — Surgically created opening (stoma) from some portion of the colon to the exterior through the abdominal wall; may be permanent or temporary

  (1) Permanent colostomy is performed when it is impossible for feces to pass through the colon because of pathological condition or because the distal bowel has been surgically removed (such as in an abdominoperineal resection)

  (2) Temporary colostomy may be performed to divert fecal flow from an inflamed area or from an operative area (such as after a bowel resection)

Note: There are several different methods of performing a colostomy.

h. **Appendectomy** — Through a McBurney incision, the appendix is severed from its attachment to the cecum and is removed

i. **Meckel's diverticulectomy** — Removal of the diverticulum attached to the distal ileum and establishment of bowel continuity

15. **Indications for resections of the small and large intestines** (Figure 7)

a. Carcinoma

b. Diverticulosis and Meckel's diverticula

c. Ulceration

d. Intussusception

e. Volvulus

f. Polyps

Note: Small, benign polyps do not require intestinal resection. However, malignant polyps and widespread familial polyposis do require intestinal resection.

g. Strangulated hernia

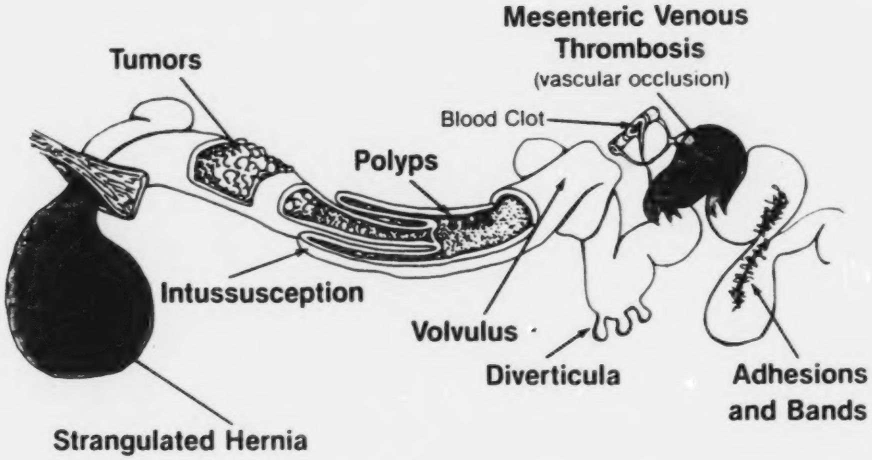
Information Sheet

h. Obstructions

  (1) Tumors

  (2) Adhesions

Figure 7—Intestinal conditions


Mesenteric Venous Thrombosis
(vascular occlusion)
Tumors
Blood Clot
Polyps
Intussusception
Volvulus
Diverticula
Adhesions and Bands
Strangulated Hernia

16. Procedure for resection of a small intestine

Note: Special bowel technique will need to be followed.

a. Abdominal wall is incised and retracted.

b. Intestine is examined to identify the diseased portions or problem areas and to decide upon the area that needs to be removed or corrected.

c. Mesentery is dissected away from the intestine with tissue and vessels tied off as needed until the diseased portion and anastomosis area are isolated.

d. Clamps are placed above and below the isolated segment, the segment is removed with cautery or knife, and is passed to the technologist as a specimen.

e. Continuity of the gastrointestinal tract is established by a suitable anastomosis—The end-to-end technique is discussed here, although the side-to-side and end-to-side techniques may also be used. Surgeon may suture or staple. Suturing is discussed here.

Information Sheet

(1) Two cut edges of intestine are aligned in close approximation.

(2) The first row of nonabsorbable interrupted sutures are placed to form the posterior wall of the anastomosis (serosa of posterior wall).

(3) The second row of absorbable sutures for the posterior wall are placed using continuous or interrupted technique (mucosa of posterior wall).

(4) The first row of absorbable sutures are placed using interrupted or continuous technique to form the anterior wall of the anastomosis (mucosa of anterior wall).

(5) The second row of nonabsorbable interrupted sutures for the anterior wall are placed (serosa of anterior wall). Clamps may be removed prior to or after this step.

(6) When the anastomosis is completed, the mesenteric defect is closed with interrupted sutures to prevent postoperative obstruction. Care is taken to prevent injury to the mesenteric vessels.

f. Adequate patency of the anastomosis is checked.

g. Wound is closed and dressed.

17. Procedure for an appendectomy

Note: Special bowel technique will need to be followed.

a. Surgeon enters abdomen through a McBurney incision.

b. Assistant retracts wound edges with a Richardson or similar retractor.

c. Surgeon grasps appendix with Babcock clamps and delivers it into the wound site.

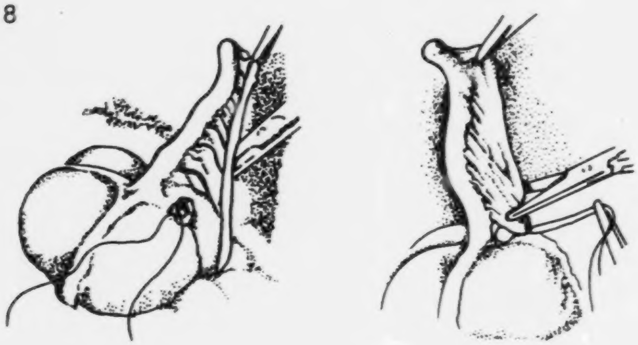
d. A moist lap sponge is placed around the base of the appendix to prevent contamination of the wound with bowel contents.

Information Sheet

e. Surgeon isolates the appendix from its attachments to the bowel (mesoappendix).

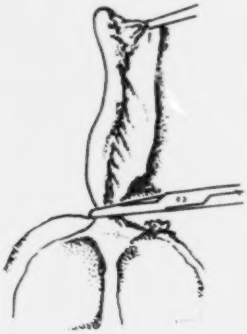
Note: Technologist should have a free tie for the base and a purse-string suture available.

Figure 8



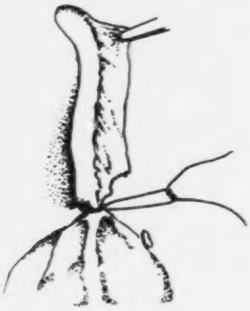
f. Base of appendix is grasped with a straight clamp.

Figure 9



g. Clamp is removed and surgeon ligates the base of the appendix in groove left by clamp.

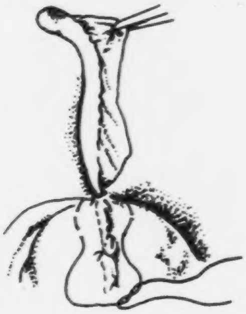
Figure 10



Information Sheet

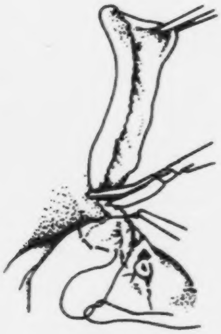
h. Surgeon places purse-string suture around the appendix.

Figure 11



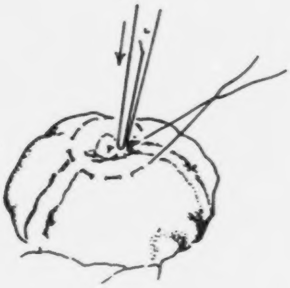
i. Surgeon places clamp distal to ligature, amputates the appendix, and delivers it to the dirty basin.

Figure 12



j. Surgeon or assistant inverts the appendix stump into the cecum, and surgeon ties the purse-string suture.

Figure 13



Information Sheet

k. Instruments are discarded into the dirty basin.

l. Wound is irrigated with warm saline solution, and abdomen is closed.

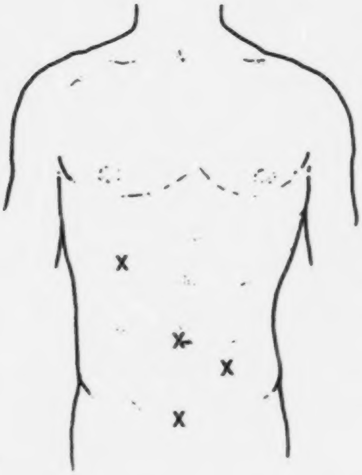
18. **Procedure for a laparoscopic appendectomy**

a. Patient is placed in the supine position and is prepped and draped.

b. Pneumoperitoneum is established using an insufflation needle.

c. Three or four trocars are placed in selected sites in the abdomen.

Figure 14—Possible trocar sites



d. The appendix is grasped and divided from the mesoappendix using electrosurgical unit (probe with hook dissector).

e. Surgeon applies suture ligatures to base of appendix.

f. Surgeon dissects the appendix free and delivers it from the wound through a trocar port. A retrieval bag may be used.

g. Surgeon cauterizes the appendiceal stump.

h. Area is irrigated and checked for hemostasis. All instruments are removed, and the pneumoperitoneum is released.

i. Wounds are closed in routine manner, and dressings are placed over each puncture site.

Information Sheet

19. Characteristics of abdominoperineal resection (APR)

a. Through combined abdominal and perineal incisions, the anus, rectum, and sigmoid colon are removed en bloc.

b. Procedure is performed to treat cancer of the lower rectum.

c. Procedure necessitates the formation of a permanent colostomy in the abdominal wall for drainage of bowel contents.

d. Procedure is often performed as two simultaneous procedures, with one team operating on the abdominal region and a second on the perineal portion.

e. When procedure is performed as two simultaneous procedures, patient is placed in a modified lithotomy position.

f. As part of the abdominal team, technologist stands slightly behind the assistant and must take special care to avoid contamination while standing in this awkward position.

g. As part of the lower team, technologist stands next to the surgeon.

h. Procedure requires laparotomy short and long sets and intestinal set, plus a colostomy bag.

20. Operations on the anorectal region and descriptions

a. **Hemorrhoidectomy** — Excision and ligation of dilated varicosities of the veins of the anus and rectum to relieve discomfort and to control bleeding

b. **Fistulectomy** — Excision of tissue surrounding a fistula-in-ano to expose healthy tissue around the fistula so the tract can heal

c. **Fissurectomy** — Dilation and excision of benign lesions of the sinus tract in the sacrococcygeal region

d. **Excision of pilonidal cyst and sinus** — Excision of the cyst with sinus tracts in the sacrococcygeal region

21. Procedure for a hemorrhoidectomy

a. Patient is placed in the Kraske (jackknife), lithotomy, or left lateral Sims position, circulator tapes the buttocks apart by placing 4-inch adhesive tape on each side of the anus and attaching the ends to the operating table frame, and patient is prepped with minimal scrub prep.

Note: Surgeon may perform a sigmoidoscopy at this time before beginning the hemorrhoidectomy procedure.

Information Sheet

b. Surgeon slowly dilates the rectum with a lubricated rectal dilator.

c. Surgeon inserts a rectal speculum which the technologist may be required to hold in place.

d. Surgeon grasps hemorrhoid with a Pennington or Allis clamp.

e. Surgeon amputates the vessel, excising a small amount of rectal mucosa at the same time with a knife or electrosurgical pencil.

f. Surgeon ligates the vein with suture on a fine needle.

Note: The mucosa may be loosely approximated or left open.

g. Surgeon removes other hemorrhoids in similar manner.

Note: When all hemorrhoids have been removed, surgeon may examine the rectum digitally to be sure that the sutures have not constricted the rectal lumen.

h. Surgeon dresses the anus with antibiotic or antiseptic packing.

22. Specialized instruments for gastrointestinal surgery

Note: Many other specialized instruments could be added to this list. Complete setup will also include basic general instruments.

a. **Gallbladder instruments**

(1) Probes and dilators — Gall duct probes (Desjardin) and common duct dilators (Bakes)

(2) Scoops — Gall stone scoops (Desjardin, Ferguson), common duct scoops (Mayo), and cystic duct scoops (Mayo)

(3) Forceps — Gall duct forceps (Mixter, Lahey), gallbladder forceps (Mixter), and gall stone forceps (Mayo-Blake, Desjardin, Mixter, Randall)

b. **Gastrointestinal instruments**

(1) Tissue forceps (Allis, Thoms-Allis, Collin-Duval)

(2) Intestinal forceps (Babcock, Collin, Bainbridge, Doyen, Kocher, Mayo-Robson, Scudder)

(3) Intestinal clamps (Allen, Foss, Stone)

(4) Anastomosis clamps (Dennis, DeMartel-Wolfson)

(5) Pylorus clamps (Payr)

Information Sheet

c. **Rectal instruments**

(1) Rectal speculum (Pennington, Pratt, Sims)

(2) Rectal retractors (Cook, Sawyer)

(3) Scopes — Anoscope (Hirschman, Kelly), sphincteroscope (Kelly), and proctoscope (Hirschman, Kelly)

(4) Probes — Fistula probes (Barr, Buie) and rectal probes (Pratt)

(5) Crypt hooks (Pratt, Stewart, Barr)

(6) Hemorrhoidal ligator (McGivney) and hemorrhoid grasping forceps (McGivney)

(7) Tissue forceps (Allis, Thoms-Allis) and tissue grasping forceps (Pennington)

(8) Rectal scissors (Pratt, Kelly)

(9) Biopsy forceps (Yeoman, Turrell)

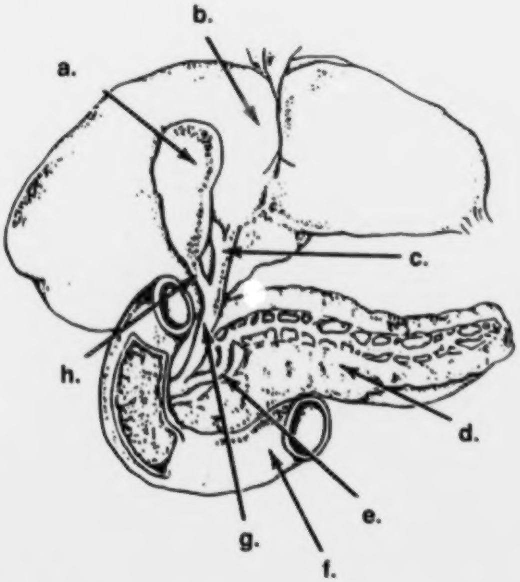
Gastrointestinal Surgery
Unit 4

Student Supplement 1—Review Anatomy of the Biliary System

Name ______________________ Date ______________

Directions: Identify the following structures of the biliary system, and place your answers in the blanks provided.

a.	______________	e.	______________
b.	______________	f.	______________
c.	______________	g.	______________
d.	______________	h.	______________



Gastrointestinal Surgery
Unit 4

Student Supplement 2—Review Anatomy of the Large Intestine

Name ______________________________ Date ____________________

Directions: Identify the following structures of the large intestine, and place your answers in the blanks provided.

a. ____________________

b. ____________________

c. _______________Colon

d. _______________Flexure

e. _______________Colon

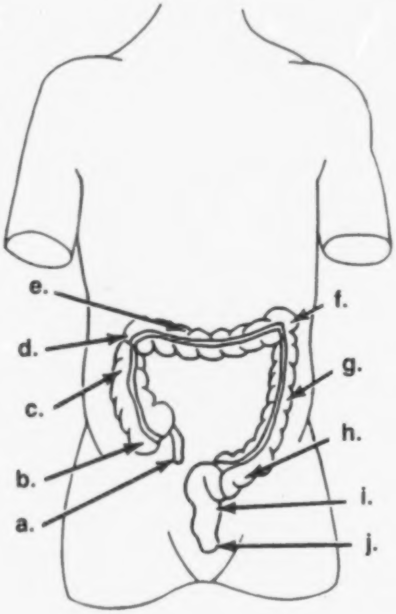
f. _______________Flexure

g. _______________Colon

h. _______________Colon

i. ____________________

j. ____________________



Gastrointestinal Surgery
Unit 4

Assignment Sheet 1—Determine Needs for Given Gastrointestinal Surgery Cases

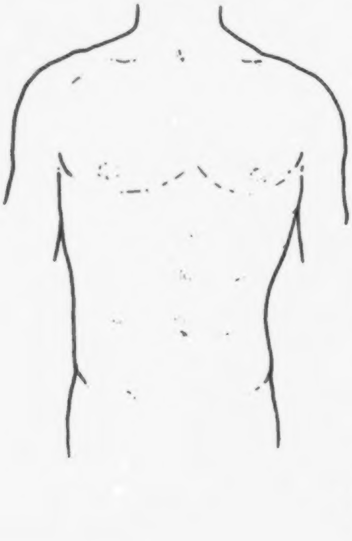
Name ______________________ Overall Rating ____________

Evaluation criteria	**Rating**
Answers are appropriate	_____
Descriptions use correct grammar, spelling, and punctuation	_____

Directions: Read each of the following cases, and fill in the blanks with the appropriate information. Refer to the information sheets as needed.

Case A: A 32-year-old female is scheduled to have her gallbladder removed laparoscopically. A cholangiogram will also be done at this time.

1. What is the name of this procedure? ______________________
2. What position will be used? ______________________
3. Which duct(s) will be used for the cholangiogram? ______________________
4. Which duct(s) will never be ligated? ______________________
5. Indicate on the following illustration of a body the most likely trocar sites (port locations) by drawing "X"s to mark the spots.



Assignment Sheet 1

6. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

   Case A Mayo

Case B: A 10-year-old female needs an emergency appendectomy.

1. What is the most common incision? ______________________________

2. What is the appendix attached to? ______________________________

3. What suturing technique will be used to finish the appendix stump? ____________

   ____

4. Describe the special technique that should be followed during this procedure.

   ____

   ____

Assignment Sheet 1

5. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

   Case B Mayo

Case C: A 59-year-old male is scheduled for resection of the large intestine with end-to-end anastomosis.

1. Name three reasons why this procedure could be needed.

   a. ____________________

   b. ____________________

   c. ____________________

2. Describe the special bowel technique used in your hospital (assigned clinical setting) for this procedure.

   ____

   ____

   ____

   ____

Assignment Sheet 1

3. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

   Case C Mayo

Obstetrics and Gynecological Surgery
Unit 5

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match common obstetrics and gynecology surgical procedures with the correct descriptions and complete statements concerning special features of the procedures. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to obstetrics and gynecological surgery with the correct definitions.
2. List purposes of obstetrics and gynecological surgery.
3. Complete statements concerning types of abortions.
4. Match common obstetrical complications with the correct descriptions.
5. Match common gynecological complications with the correct definitions.
6. Match diagnostic techniques used by gynecologists with the correct definitions.
7. Match abdominal procedures with the correct descriptions.
8. Complete statements concerning vaginal procedures and their descriptions.
9. Discuss applications of lasers for gynecological surgery.
10. Match the types of genital fistulas with the correct illustrations.
11. Select true statements concerning special features of obstetric and gynecologic surgery.
12. Match basic obstetrical and gynecological medications and solutions with their uses.
13. List specialized instruments for obstetric and gynecological surgery.
14. Arrange in order the procedure for a dilation and curettage.

Objective Sheet

15. Complete statements concerning the procedure for the repair of a cystocele and rectocele.

16. Arrange in order the procedure for a vaginal hysterectomy.

17. Complete statements concerning the procedure for an abdominal hysterectomy.

18. Complete statements concerning the procedure for a laparoscopy.

19. Distinguish among the types of hysterectomies.

20. List indications for a cesarean section.

21. Complete statements concerning the procedure for a cesarean section.

22. Determine needs for given obstetrics and gynecological surgery cases. (Assignment Sheet 1)

Obstetrics and Gynecological Surgery
Unit 5

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.
2. Review Teaching Suggestions section that follows. Plan for classroom activities.
3. Plan for students with special needs.
4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Female Reproductive System (Objective 1)
   TM 2—Types of Genital Fistulas (Objective 10)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.
6. Develop teaching plan. Adjust for different learning styles.
7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.
9. Discuss unit and specific objectives.
10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.
11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.
12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Suggested Activities

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to obstetrics and gynecological surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in OB/GYN surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in OB/GYN surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

6. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in OB/GYN surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

7. Have assigned students give oral reports on their research about OB/GYN surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in OB/GYN. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

8. Divide students into groups, and assign each group a different procedure commonly performed in OB/GYN surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic setups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo setups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

Suggested Activities

9. Show videos of procedures common to OB/GYN surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

10. Provide clinical orientation and guided clinical practice of OB/GYN surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Atkinson, Lucy Jo. *Berry & Kohn's Operating Room Technique*, 7th ed. St. Louis: Mosby Year Book, Inc., 1992.

2. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1994.

3. Goldman, A. Maxine. *Pocket Guide to the Operating Room.* Philadelphia: F. A. Davis Company, 1988.

4. *Laparoscopically Assisted Vaginal Hysterectomy.* Norwalk, CT: Auto Suture Company, a division of United States Surgical Corporation, 1992.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

Suggested Supplemental Resources

1. *Inside Gynecologic Surgery: An Illustrated Guide.* 200-page, hard bound book illustrating the most up-to-date gynecologic surgical procedures. Order #692-B. 1993. Developed by Johnson & Johnson Medical Inc. Available from:

   AD/COM, INC.
   2003 Lamar Blvd., East
   Arlington, TX 76006
   800-486-8247

Suggested Activities

2. *Hysteroscopy*, 20-minute videotape demonstrates 19 cases of office hysteroscopy. Available from:

   Euro-Med, a division of Cooper Surgical
   15 Forest Parkway
   Shelton, CT 06484
   800-848-0033 or 203-929-6321

3. 5-Part Gynecological Series developed by Videomed, Inc. includes five patient education videos (each 10 minutes long) on common gynecological problems and procedures.

   a. *Abdominal Hysterectomy*
   b. *Vaginal Hysterectomy*
   c. *Laparoscopy*
   d. *Pap Smear and Colposcopy*
   e. *Endometriosis*

   Individual tapes or series available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL-AJN

4. *Cesarean Delivery*, M088, 1989, 23-minute videotape that discusses the role of labor and delivery nurses for this surgical procedure. Available from:

   Medcom/Trainex
   P.O. Box 3225
   Garden Grove, CA 92642
   800-877-1443

5. *Precautions in Obstetrics*, DG-1639, 1988, 25-minute videotape illustrating the tools and techniques needed to minimize the risks of infection to obstetric and neonatal staff.

6. *Cesarean Delivery*, DG-1640, 1989, 22-minute videotape covering the indications, type of incision, use of prophylactic antibiotics, and postoperative care for cesareans.

Suggested Activities

7. *Laparoscopic Infertility Surgery*, DG-1646, 1989, 16-minute videotape showing three laparoscopic procedures—lysis of minimal adhesions, laparoscopic tuboplasty, and laparoscopic resection of ectopic pregnancy.

5 - 7 are available from:

Cine-Med Inc.
127 Main Street North
Woodbury, CT 06798
800-633-0004 or 203-263-0006

Obstetrics and Gynecological Surgery
Unit 5

Answers to Student Supplements

Student Supplement 1

a. Uterine tubes (fallopian tubes, oviducts, salpinx)
b. Ovaries
c. Uterus
d. Vagina
e. Vulva
f. Perineum
g. Urethra meatus
h. Vaginal orifice

Student Supplement 2

1. d
2. c
3. c
4. a
5. c
6. b
7. c
8. b
9. b
10. d
11. b
12. a
13. c
14. d
15. c
16. a
17. c
18. b
19. c
20. a
21. c
22. b
23. a
24. d
25. d
26. d
27. b

Obstetrics and Gynecological Surgery
Unit 5

Answers to Assignment Sheet 1

Case A:

1. Metrorrhagia and menorrhagia
2. Lithotomy
3. Vaginal at which time the bladder should be drained
4. General, spinal, caudal, or local block
5. There will be two—endocervical and endometrial. They must be kept separate and labeled as such.
6. Instructor should evaluate for completeness and appropriate arrangement. The following instruments should be included: Weighted speculum, tenaculum, uterine sound, dilator, and curettes

Case B:

1. Supine or reverse Trendelenburg
2. Vaginal prep should be done first, and a Foley catheter inserted followed by a separate abdominal prep.
3. Lower midline or pfannenstiel (bikini)
4. All instruments that come in contact with the cervix should be kept separate.
5. Instructor should evaluate for completeness and appropriate arrangement. The following instruments should be included: Heaneys and/or Heaney-Ballentines and Jorgenson scissors.

Case C:

1. Any three of the following: Breech or transverse presentation, cephalopelvic disproportion, habitual death of the fetus, preeclamptic toxemia, carcinoma of the cervix, fetal distress, abruptio placenta, placenta previa, prolapse of the umbilical cord, previous cesarean section, presence of sexually transmitted disease, others
2. Supine (with right hip elevated)

Answers to Assignment Sheet 1

3. General or spinal

4. Any two of the following: Cord blood samples will be taken, the surgical team focus is on the mother, the placenta is removed manually, counts begin while the surgeon is closing the uterus

5. The instructor should evaluate for completeness and accuracy. It should include basic instruments plus lister bandage scissors, bladder retractor, penningtons, and forceps (usually kept on the back table).

Obstetrics and Gynecological Surgery
Unit 5

Answers to Written Test

1. a. 6
   b. 5
   c. 20
   d. 16
   e. 1
   f. 7
   g. 22
   h. 15
   i. 4
   j. 21
   k. 9
   l. 12

2. Any three of the following:

   a. To diagnose abnormal conditions
   b. To treat abnormal conditions
   c. To relieve pain
   d. To electively prevent pregnancy
   e. To assist infertile couples to conceive
   f. To prevent spontaneous abortion when structural defects are present
   g. To abdominally deliver an infant when vaginal delivery is impossible or contraindicated

3. a. 2 months or longer
   b. Incomplete
   c. Patient is about to abort
   d. Spontaneous
   e. Abortion performed because the patient wishes to terminate the pregnancy

4. a. 4
   b. 9
   c. 1
   d. 3
   e. 2
   f. 10
   g. 6
   h. 11
   i. 8
   j. 5

5. a. 1
   b. 2
   c. 4
   d. 5
   e. 3

6. a. 10
   b. 9
   c. 13
   d. 11
   e. 3
   f. 5
   g. 8
   h. 4
   i. 12
   j. 6

Answers to Written Test

7. a. 3
   b. 14
   c. 13
   d. 9
   e. 5
   f. 10
   g. 1
   h. 4
   i. 6
   j. 7
   k. 11
   l. 15

8. a. Dilation and curettage (D and C)
   b. Termination of pregnancy or for early incomplete spontaneous abortion
   c. A cone of tissue
   d. Bartholin's
   e. Cystocele, rectocele
   f. Shirodkar or MacDonald cerclage
   g. Vaginal hysterectomy
   h. Labia majora, labia minora
   i. Le Fort operation (colpocleisis)
   j. Uterus

9. Discussion should include any two of the following:

   a. Ablation of lesions
   b. Eradication of Bartholin's duct abscess
   c. Endometrial ablation to treat menorrhagia
   d. Transecting uterine ligaments and controlling bleeding during a LAVH

10. a. 2
    b. 3
    c. 1

11. a. T
    b. F
    c. T
    d. T
    e. F
    f. F
    g. T
    h. T
    i. T
    j. F
    k. F
    l. T
    m. T
    n. F

12. a. 2
    b. 6
    c. 8
    d. 5

Answers to Written Test

13. a. Any three of the following:

    (1) O'Sullivan-O'Connor retractor
    (2) Heaney hysterectomy forceps or Heaney-Ballentine forceps
    (3) Heaney needleholder
    (4) Jorgenson scissors (long)
    (5) Others evaluated by instructor

    b. Any three of the following:

    (1) Auvard vaginal speculum, weighted
    (2) Graves self-retaining vaginal speculum
    (3) Heaney retractor
    (4) Jacobs vulsellum forceps/tenaculum or uterine tenaculum
    (5) Uterine sound
    (6) Hank or Hegar uterine dilators
    (7) Thomas or Sims uterine curettes
    (8) Gaylor biopsy forceps
    (9) Leep loop electrodes
    (10) Uterine forceps
    (11) Hysteroscope set
    (12) Others evaluated by instructor

14. a. 5
    b. 7
    c. 9
    d. 8
    e. 1
    f. 6
    g. 2
    h. 4
    i. 3

15. a. Lithotomy
    b. Weighted speculum
    c. Anterior
    d. Retracted
    e. Fascia
    f. Fascia
    g. Vaginal
    h. Posterior
    i. Transverse
    j. Mayo
    k. Levator
    l. Interrupted
    m. Medicated packing

Answers to Written Test

16. a. 3
    b. 8
    c. 7
    d. 6
    e. 4
    f. 5
    g. 1
    h. 2

17. a. Abdominally and vaginally
    b. Pfannenstiel
    c. Blunt
    d. Manually
    e. Metzenbaum
    f. Lap sponges
    g. Absorbable
    h. Long
    i. Kocher
    j. Technologist
    k. Vaginal
    l. Bladder

18. a. Lithotomy
    b. Gloves
    c. Manipulator
    d. Circulator
    e. Umbilicus
    f. A blood vessel has not been punctured
    g. Needle
    h. Carbon dioxide
    i. Needle
    j. Removes
    k. Hot water or antifogging solution
    l. Laparoscope
    m. Disease or injury
    n. Adhesive bandages (Band-Aids®)

19. a. A
    b. L
    c. V or L
    d. V or L
    e. A or L
    f. A
    g. V
    h. A
    i. V or L
    j. A
    k. A or L

Answers to Written Test

20. Any six of the following:

    a. Abnormal presentations (breech, transverse, etc.)
    b. Abruptio placenta
    c. Carcinoma of the cervix
    d. Cephalopelvic disproportion
    e. Cervix will not dilate
    f. Fetal distress
    g. Habitual death of the fetus during the course of labor (repeated stillbirths)
    h. Placenta previa
    i. Preeclamptic toxemia in patients where difficult labor is anticipated
    j. Presence of sexually transmitted diseases such as genital herpes that could be transmitted from the mother to the fetus during vaginal delivery
    k. Previous cesarean section
    l. Prolapse of the umbilical cord
    m. When other abdominal surgical procedures are scheduled

21. a. 2
    b. 2
    c. 1
    d. 4
    e. 3
    f. 4

Obstetrics and Gynecological Surgery
Unit 5

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

______a. Abnormal growth or development

______b. Act of stretching or enlarging an organ or part of the body

______c. Manner in which the fetus is positioned in relation to the cervix

______d. Suturing of cyst walls to edges of wound, after evacuation, to permit the cavity to close by granulation

______e. Noninvasive cancer located in a small area of the epithelial layer

______f. Presence of functioning endometrial tissue in places where it is not normally found

______g. Inability of the body to control the evacuative function because of physical stress on body parts involved

______h. Infertility procedure in which ova are removed, fertilized and incubated for approximately 48 hours in a laboratory setting, and then transferred into the prospective mother's uterus

______i. Herniation of the bladder into the vaginal canal

______j. Herniation of the rectum into the vaginal canal

1. Carcinoma in situ
2. Chromotubation
3. Conization
4. Cystocele
5. Dilation
6. Dysplasia
7. Endometriosis
8. Enterocele
9. Episiotomy
10. Fibroma
11. Gamete intrafallopian transfer
12. Gynecology
13. Insufflation
14. Invasive cancer
15. In vitro fertilization
16. Marsupialization
17. Myoma

Written Test

______k. Incision into the perineum during normal labor to prevent lacerations and to facilitate delivery with less trauma

______l. Branch of medicine that deals with the pelvic diseases and hygiene of women

18. Obstetrics
19. Pneumoperitoneum
20. Presentation
21. Rectocele
22. Stress incontinence
23. Vaginal vault

2. List three purposes of obstetrics and gynecological surgery.

   a. ____

   b. ____

   c. ____

3. Complete the following statements concerning types of abortions by filling in the blanks with the correct word(s).

   a. Missed abortion — Product of conception (fetus) is nonliving and is retained in the uterus for ____________________

   b. ____________________ abortion — Part of the product of conception has been retained in the uterus

   c. Imminent abortion — ____

   d. ____________________ abortion — Abortion occurring without having been induced

   e. Voluntary interrupted abortion — ____

Written Test

4. Match obstetrical complications on the right with the correct descriptions.

______a. Painful and difficult labor

______b. Placenta is abnormally implanted in the lower uterine segment and may completely cover the os cervix

______c. Placenta is prematurely separated from the wall of the uterus

______d. Mother's pelvis is too small to accommodate the head of the fetus

______e. Buttocks are presented first

______f. Fetus is presented crosswise

______g. Feet are presented first

______h. Upper back of the head is presented first

______i. Inability or diminished ability to produce offspring

______j. Fertilized ovum becomes implanted outside the uterus

1. Abruptio placenta
2. Breech presentation
3. Cephalopelvic disproportion
4. Dystocia
5. Ectopic pregnancy
6. Footling presentation
7. Incompetent cervical os
8. Infertility
9. Placenta previa
10. Transverse presentation

5. Match gynecological complications on the right with the correct definitions.

______a. Absence of menstruation

______b. Painful or difficult menstruation

______c. Excessive bleeding during menstruation

______d. Active uterine bleeding at times other than during menstruation

______e. Areas of pathologically altered tissue that may occur on or in all reproductive structures and may be malignant or benign

1. Amenorrhea
2. Dysmenorrhea
3. Lesions
4. Menorrhagia
5. Metrorrhagia
6. Sexually transmitted diseases
7. Weakened musculature

Written Test

6. Match diagnostic techniques used by gynecologists on the right with the correct descriptions.

_____a. Inspection and palpation of external genitalia, uterus, fallopian tubes, and ovaries, and speculum examination of the vagina and cervix

_____b. Cytologic study of smears of cervical and endocervical tissue obtained by scrapings to diagnose the presence of abnormal tissue

_____c. Staining the vaginal vault and cervical squamous epithelium with an iodine solution to pinpoint abnormal tissues which do not stain brown as normal tissues do

_____d. Removal of small pieces of tissues with cervical biopsy forceps

_____e. Biopsy taken with a scalpel or cervitome to include the squamo-columnar junction of the ectocervix and tapered to include the endocervical canal to the level of the internal os

_____f. Endoscopic visualization of pelvic organs and adjacent structures in the peritoneal cavity through a small incision in the posterior vaginal cul-de-sac

_____g. Endoscopic visualization of the peritoneal cavity through the anterior abdominal wall after the establishment of a pneumoperitoneum

_____h. Insertion of a spinal needle into the cul-de-sac for aspiration of any fluid, blood, or pus collected there

_____i. Introduction of carbon dioxide into the uterocervical canal to check for tubal patency in the evaluation of infertility

_____j. Insertion of a water-soluble radiopaque dye into the cervical canal to study the structure and function of the uterus and tubes in the evaluation of infertility

1. Colposcopy
2. Colpotomy
3. Conization of the cervix
4. Culdocentesis
5. Culdoscopy
6. Hysterosalpingography
7. Hysteroscopy
8. Laparoscopy
9. Papanicolaou smear
10. Pelvic examination
11. Punch biopsy
12. Rubin's test
13. Schiller's test
14. Uterine curettage

Written Test

7. Match abdominal procedures on the right with the correct descriptions.

______a. Endoscopic visualization of the peritoneal cavity through the anterior abdominal wall primarily used as a diagnostic procedure, but which may also be used for other procedures such as aspiration of cysts, release of adhesions, tissue biopsies, and tubal ligations

______b. Removal of entire uterus, including the corpus and the cervix

______c. Removal of body of uterus, leaving the cervix in place

______d. En bloc dissection and removal of all pelvic lymph nodes and wide removal of uterus, tubes, ovaries, supporting ligaments, and upper vagina

______e. Removal of fibromyomas from the uterine wall for pressure symptoms in women desiring children

______f. Removal of a fallopian tube

______g. Removal of the reproductive organs, distal part of the ureters, bladder, and vagina with resulting diversion of ureters to an ileal conduit for cancer of the cervix, vagina, or vulva with extension to the bladder

______h. Suspension of the bladder to the symphysis pubis to correct stress incontinence

______i. Removal of an ovary

______j. Removal of an ovarian cyst

______k. Removal of a tube and all or part of the associated ovary

______l. Interruption of fallopian tube continuity designed to sterilize the patient

1. Anterior exenteration
2. Cesarean section
3. Laparoscopy
4. Marshall-Marchetti-Krantz
5. Myomectomy
6. Oophorectomy
7. Oophorocystectomy
8. Posterior exenteration
9. Radical hysterectomy
10. Salpingectomy
11. Salpingo-oophorectomy
12. Salpingostomy
13. Subtotal hysterectomy
14. Total hysterectomy
15. Tubal ligation

Written Test

8. Complete statements concerning vaginal procedures by filling in the blanks with the correct answers.

   a. ____________________ is the dilation of the os cervix and curetting of endocervical and/or endometrial tissue to obtain tissue for microscopic examination, to halt uterine bleeding, to terminate pregnancy, or to remove tissue following an incomplete or missed abortion

   b. Suction curettage — Vacuum aspiration of intrauterine contents performed for ____________________

   c. Conization of the cervix — Excision of ____________________ from the cervix to remove a cancerous lesion or tissue for biopsy

   d. Marsupialization of ____________________ duct cyst or abscess — Removal or incision of the cyst through the vaginal outlet and drainage of the area

   e. Anterior and posterior repair — Reconstruction of the vaginal walls, the pelvic floor, and the muscles and fascia of the rectum, urethra, bladder, and perineum to correct a ____________________ and a ____________________ and to reestablish the support of the anterior and posterior vaginal walls and thereby restore the bladder and rectum to their normal positions

   f. ____________________ operation — Postconceptional placement of a collar-type ligature at the level of the internal os to close it for incompetence of the cervix

   g. ____________________ — Removal of the uterus through an incision made in the vaginal wall and the pelvic cavity

   h. Simple vulvectomy — Removal of the ____________________ and ____________________, possibly the glans clitoris, and occasionally the perianal area with a plastic closure for treatment of carcinoma in situ of the vulva

   i. ____________________ — Procedure which obliterates the vagina by denuding and approximating the anterior and posterior walls to correct uterine prolapse; generally performed only on elderly patients

   j. Hysteroscopy — Direct visualization of the interior of the ____________________ to diagnose or treat disease via a fiberoptic scope

Written Test

9. Discuss two applications of lasers for gynecological surgery.

   a. ____

   ____

   b. ____

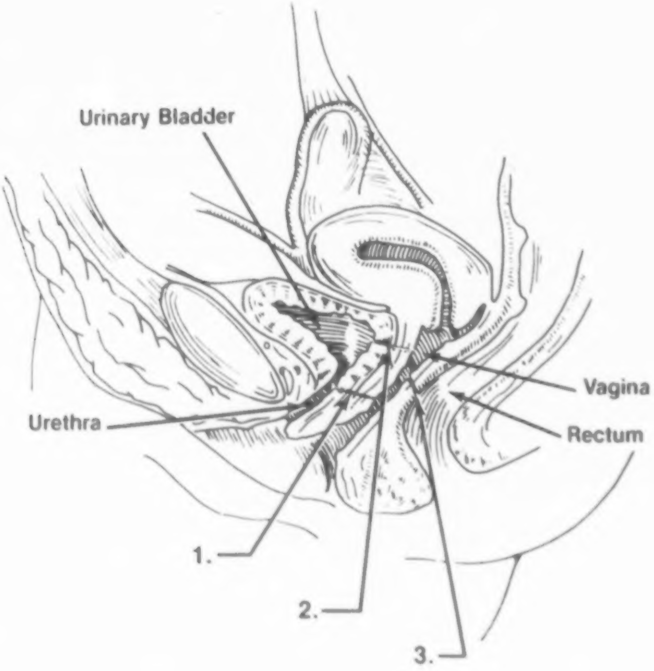
   ____

10. Match types of genital fistulas listed below with the correct illustrations, and place the corresponding letters in the blanks provided.

______a. Vesicovaginal fistula

______b. Rectovaginal fistula

______c. Urethrovaginal fistula


Urinary Bladder
Vagina
Urethra
Rectum
1.
2.
3.

BEST COPY AVAILABLE

Written Test

11. Select true statements concerning special features of obstetric and gynecologic operations by placing a "T" or "F" next to the true or false statements.

______a. Patient is catheterized in OR (if not before) to prevent the bladder from becoming distended during the surgical procedure and to record urinary output.

______b. Local anesthesia is primarily used.

______c. Early ambulation and use of antiembolic stockings are especially important in pelvic surgery because deep major vessels are in the operative field, lithotomy position slows circulation, and postoperative thrombosis is a serious complication.

______d. Various drains such as Penrose or closed-wound suction drainage may be used to prevent hematoma or serum accumulation.

______e. Vaginal procedures are usually performed with the patient in supine position.

______f. Instrumentation for vaginal procedures includes short instruments for use within the vaginal canal and uterine cavity.

______g. In vaginal procedures sponges should be secured on sponge forceps in deep areas. Long narrow gauze pads with tape on the end may be used for packing off abdominal viscera in vaginal procedures.

______h. Medicated vaginal packing may be inserted following certain procedures.

______i. In the abdominal approach, supine or Trendelenburg position is used.

______j. The preparation and drapes for abdominal procedures are the same as for vaginal procedures.

______k. When there is a large abdominal mass or the pelvic organs are pushed from their normal relationships, urethral catheters may be inserted prior to operation to permit easy identification of the urethra.

______l. Instrumentation for abdominal procedures includes basic laparotomy setup with the addition of long instruments for deep manipulations within the pelvis and/or laparoscopic instruments.

______m. In combined procedures, if one procedure is diagnostic, it will be performed first.

______n. In combined procedures, if both procedures are non-diagnostic, the vaginal procedure will generally be performed first.

Written Test

12. Match basic OB/GYN medications and solutions on the right with the correct uses.

______a. Used in conjunction with vaginal packing after such vaginal procedures as cautery or laser ablation

______b. Dye used diluted in normal saline during chromotubation to check for patency

______c. Stimulates the uterus to contract, thus inducing labor or for expelling remaining tissue after delivery

______d. Strong iodine solution applied to vaginal tissue and the cervix to identify abnormal tissue

1. Acetic acid
2. Anti-infective creams
3. Gentian violet
4. Hyskon®
5. Lugol's solution
6. Methylene blue
7. Oxycel®, Surgicel®
8. Oxytocics

13. List at least three specialized instruments for each category of obstetric and gynecological surgery.

a. Specialized abdominal hysterectomy instruments

(1) ______________________________

(2) ______________________________

(3) ______________________________

b. Specialized vaginal instruments

(1) ______________________________

(2) ______________________________

(3) ______________________________

Written Test

14. Arrange in order the procedure for a dilation and curettage by placing the correct sequence numbers (1-9) in the appropriate blanks.

_______a. Surgeon slowly dilates the cervix using Hegar or Hanks uterine dilators.

_______b. Surgeon gently curettes uterus, allowing the endometrial specimen to collect on the Telfa.

_______c. Surgeon or scrub person dresses perineum with a perineal pad.

_______d. Surgeon passes endometrial specimen to technologist, and removes the speculum.

_______e. With the patient in the lithotomy position, surgeon inserts a weighted speculum into the vaginal outlet and grasps the cervix with a tenaculum.

___*6*___f. Surgeon places a Telfa strip over the speculum.

_______g. Surgeon carefully introduces a graduated sound into the cervix to determine the depth and direction of the uterine cavity and therefore prevent perforation during the procedure.

_______h. Surgeon passes endocervical specimen to technologist. Two specimens are usually taken and must be kept separate and labeled as such.

_______i. Surgeon uses curette of choice to obtain an endocervical tissue specimen.

15. Complete statements concerning the procedure for the repair of a cystocele and rectocele by circling the correct answers.

a. Patient is placed in the (supine, lithotomy) position, prepped, and circulator performs a straight catheterization.

b. Surgeon inserts a (weighted speculum, retractor) into the vaginal outlet, grasps the cervix with a tenaculum, and brings it forward.

c. Surgeon makes an incision in the (anterior, posterior) vaginal wall.

d. Incision edges are grasped with several clamps and (retracted, ligated).

e. Surgeon deepens the incision with sharp and blunt dissection, and advances the incision through the vaginal wall and into the (fascia, bladder) that lies behind it using additional clamps as needed.

Written Test

f. When bladder neck is reached, surgeon places several absorbable sutures, size 0, through the (bladder, fascia), thus tightening the tissue to prevent the bulging.

g. Surgeon excises the (uterine, vaginal) mucosa, and approximates the vaginal walls with absorbable sutures to complete the anterior repair.

h. To begin the posterior repair, surgeon places two Allis clamps on each side of the vaginal outlet on the (anterior, posterior) side.

i. Assistant offers traction with the clamps while surgeon makes a (transverse, vertical) incision in the mucosa.

j. Surgeon deepens the incision with curved (bandage, Mayo) or Metzenbaum scissors to the level of the rectum.

k. To correct the bulging of the rectum, surgeon brings the (levator, internal oblique) muscles together with interrupted absorbable sutures, size 2-0.

l. Surgeon excises the excess vaginal mucosa, and reconstructs the vaginal wall with (continuous, interrupted) absorbable sutures, size 2-0 swaged to a small needle.

m. Surgeon usually inserts a Foley or suprapubic catheter, and dresses the vagina with (medicated packing, moist 4 × 4s).

16. Arrange in order the procedure for a vaginal hysterectomy by placing the correct sequence numbers (1-9) in the appropriate blanks.

______ a. Surgeon double-clamps, divides, and ligates the first set of ligaments with absorbable suture ligatures of size 1 or 0 mounted or swaged to a heavy tapered needle.

______ b. Surgeon reperitonealizes the bladder, closes the peritoneum, inserts a Foley catheter, and may dress the wound with a perineal pad.

______ c. When uterus is mobilized, surgeon delivers it to the technologist as a specimen.

___*6*___ d. Surgeon continues mobilization of the uterus using long tissue forceps and long dissecting scissors.

______ e. Surgeon picks up the posterior peritoneum with toothed tissue forceps and incises it with the knife or scissors.

______f. Surgeon detaches the peritoneal attachment to the bladder with Mayo scissors.

______g. Patient is placed in the lithotomy position, prepped, and bladder is drained.

______h. Surgeon grasps the cervix with a uterine tenaculum, and makes a circular incision around the cervix using the knife or curved Mayo scissors.

17. Complete the following statements concerning the procedure for an abdominal hysterectomy by circling the correct answers.

    a. Patient is placed in supine position, prepped (abdominally only, abdominally and vaginally), and a Foley catheter is inserted.

    b. Surgeon incises abdomen using a lower midline incision or (Pfannenstiel, oblique inguinal) incision, and deepens the incision through the subcutaneous tissue with the deep knife or electrosurgical pencil.

    c. Surgeon nicks fascia with the knife, incises with curved Mayo scissors, grasps fascial margin with two or more Kocher clamps, and separates fascia from underlying muscle using (blunt, sharp) dissection.

    d. Surgeon divides the muscle layer (manually, using the electrosurgical pencil).

    e. Surgeon nicks peritoneum with the knife, lengthens with (Mayo, Metzenbaum) scissors, and places in wound a self-retaining retractor such as O'Connor-O'Sullivan or Balfour.

    f. Surgeon packs bowel away from the uterus with moist (lap sponges, 4 × 4s).

    g. Surgeon isolates the uterus by severing it from the uterine ligaments, ovaries, and fallopian tubes by double-clamping, dividing, and ligating with (nonabsorbable, absorbable) sutures.

    h. Surgeon separates the uterus and the bladder using Mayo scissors and (short, long) tissue forceps by dissecting the peritoneal covering away from the bladder.

    i. Surgeon mobilizes uterus, places long Allis or (Adson, Kocher) clamps around the margin of the vaginal cuff, and then divides it from the vagina using long scissors or the long knife to completely free the uterus.

    j. Surgeon passes uterus to (assistant, technologist) as a specimen and places all instruments that have come in contact with the cervix or vagina in the designated basin.

Written Test

k. Surgeon closes (vaginal, uterine) vault usually with the same type of suture used on the uterine ligaments while a sponge count in taken.

l. Surgeon reperitonealizes the (bladder, fallopian) flap with 2-0 or 3-0 absorbable swaged suture.

m. Surgeon closes the layers of the abdomen using sutures of choice.

18. Complete the following statements concerning the procedure for a laparoscopy by filling in the blanks with the correct answers.

a. Patient is placed in a modified ____________________ position with lowered stirrups, is vaginally and abdominally prepped, and the bladder is drained.

b. Technologist ____________________ surgeon.

c. Surgeon inserts uterine ____________________ into the cervix.

d. ____________________ removes surgeon's gloves, and technologist gowns and gloves the surgeon.

e. Surgeon makes a small nick in the abdominal wall close to the ____________________.

f. Surgeon inserts an insufflation needle through the incision and attaches a 10-cc. syringe filled with saline solution so the surgeon can aspirate to make sure that
____.

g. Surgeon attaches a length of flexible tubing to the ____________________ while one end of the tubing is passed to the circulator, who connects it to the insufflator.

h. Circulator activates the insufflator and the abdomen is slowly filled with ____________________ which creates a pneumoperitoneum.

i. When sufficient gas has entered the abdomen, surgeon withdraws the ____________________.

j. Surgeon inserts the large trocar and sleeve through the incision, ____________________ the trocar, and leaves the sleeve.

k. Technologist dips scope in ____________________ or wipes the lens with soap so the scope's lenses do not fog.

Written Test

l. Surgeon inserts the __________________ into the sleeve and connects the light source cable.

m. Surgeon examines the abdominal contents for __________________, and then performs whatever additional procedure is decided upon, if needed.

n. Surgeon allows gas to escape through the sleeve, removes the sleeve, closes the incision(s) with subcuticular absorbable suture, and dresses with __________________.

19. Distinguish among the types of hysterectomies by placing an "A" next to those of an abdominal hysterectomy, a "V" next to those of a vaginal hysterectomy, and an "L" next to those of a laparoscopic assisted vaginal hysterectomy.

______a. Allows for easier removal of the tubes and ovaries (and appendix) at the same time

______b. Leaves minimal scars at puncture sites

______c. Leaves no visible incision scar

______d. Is indicated for prolapse of the uterus

______e. Provides better exposure

______f. Is operation of choice for leiomyomata, adenomyosis, and uterine cancer

______g. Procedure requires least amount of time

______h. Is indicated for fibroid tumors that may be too large to remove vaginally

______i. Recovery period requires less time

______j. Is a cleaner procedure since it is not near the anal area

______k. Allows for exploration of abdominal organs, especially if cancer is suspected

Written Test

20. List six indications for a cesarean section.

a. ____

b. ____

c. ____

d. ____

e. ____

f. ____

21. Complete statements concerning the procedure for a cesarean section by placing the correct numbers in the blanks provided.

______a. When the patient is placed in the supine position, her right ____________________ may be elevated.

(1) Arm
(2) Hip
(3) Leg
(4) Shoulder

______b. When spinal anesthesia is used, the patient will be prepped ____________________ being anesthetized.

(1) Before
(2) After

______c. For a cesarean section, the surgeon will most likely use a ____________________ incision.

(1) Pfannenstiel
(2) McBurney
(3) Median
(4) Left transverse

______d. After the initial incision, the surgeon incises the peritoneal covering of the ____________________ to expose the uterus.

(1) Vagina
(2) Uterus
(3) Ovaries
(4) Bladder

Written Test

______e. What does the surgeon use to remove mucus from the newborn's airway?

(1) Suction machine
(2) Sponges (4 × 4s)
(3) Bulb syringe
(4) Control syringe

______f. After the newborn is delivered, he/she is normally handed over to the ____________________ for neonatal care and assessment.

(1) Assistant
(2) Mother
(3) Surgical technologist
(4) Pediatrician

*Permission to duplicate this test is granted.

Obstetrics and Gynecological Surgery
Unit 5

Unit Evaluation Form

Student Name ______________________ Unit Rating ________

Assignment Sheet 1—Determine Needs for Given Obstetrics and Gynecological Surgery Cases Rating ______

Comments: ______________________

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ______________________

____

Teacher Signature ______________________ Date ________

Student Signature ______________________ Date ________

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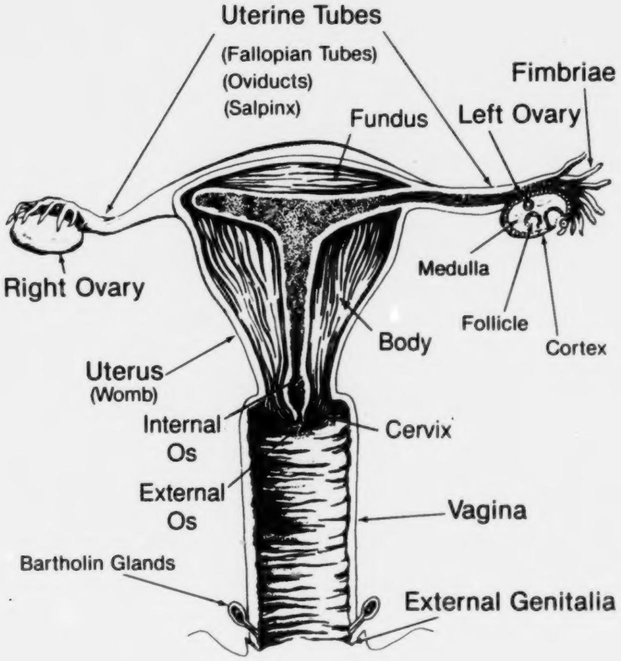
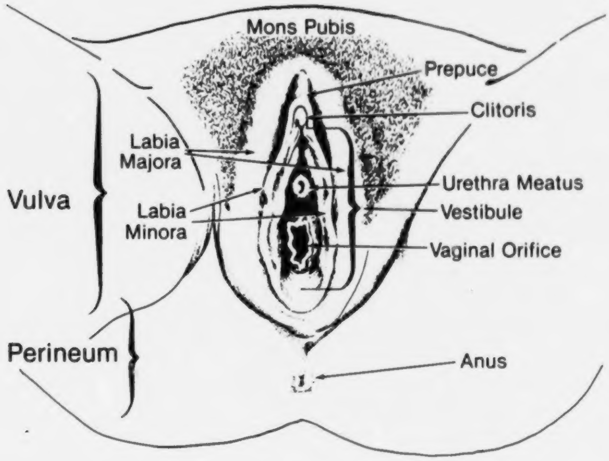
*Permission to duplicate this form is granted.

Female Reproductive System

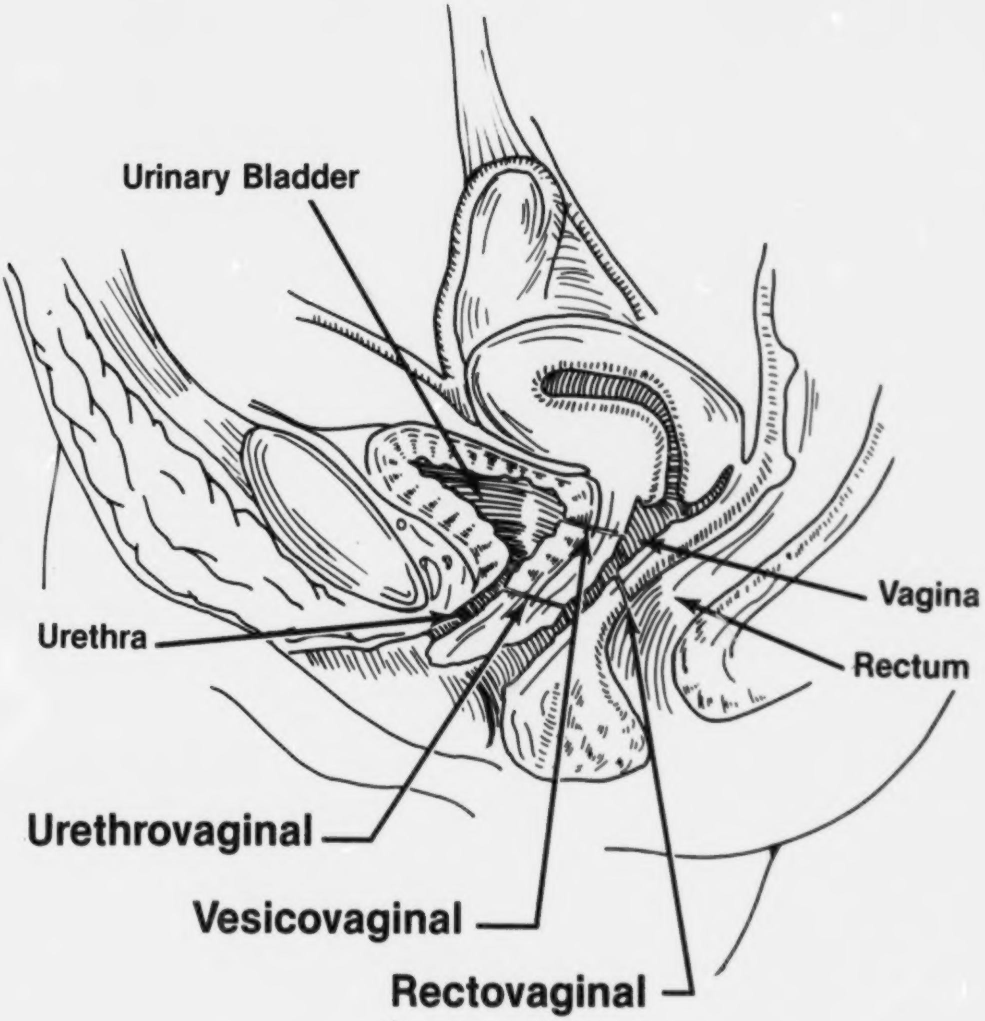
Internal Female Genitalia


Uterine Tubes
(Fallopian Tubes)
(Oviducts)
(Salpinx)
Fimbriae
Fundus
Left Ovary
Right Ovary
Medulla
Follicle
Cortex
Body
Uterus
(Womb)
Internal Os
Cervix
External Os
Vagina
Bartholin Glands
External Genitalia

External Female Genitalia


Mons Pubis
Prepuce
Clitoris
Labia Majora
Urethra Meatus
Vulva
Labia Minora
Vestibule
Vaginal Orifice
Perineum
Anus

Types of Genital Fistulas


Urinary Bladder
Vagina
Urethra
Rectum
Urethrovaginal
Vesicovaginal
Rectovaginal

Obstetrics and Gynecological Surgery
Unit 5

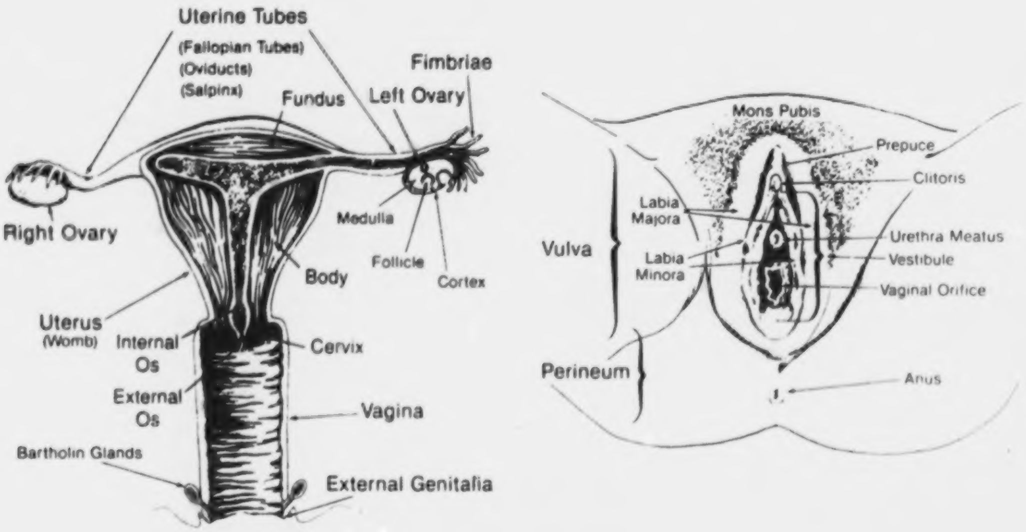
Information Sheet

1. **Terms and definitions**

   a. **Carcinoma in situ** — Noninvasive cancer located in a small area of the epithelial layer

   b. **Cervical** — Pertaining to the cervix of the uterus or to the neck region

   Figure 1 — Female reproductive system


Uterine Tubes
(Fallopian Tubes)
(Oviducts)
(Salpinx)
Fundus
Left Ovary
Fimbriae
Right Ovary
Medulla
Follicle
Cortex
Body
Uterus
(Womb)
Internal Os
Cervix
External Os
Vagina
Bartholin Glands
External Genitalia
Mons Pubis
Prepuce
Clitoris
Labia Majora
Urethra Meatus
Vulva
Labia Minora
Vestibule
Vaginal Orifice
Perineum
Anus

   c. **Chromotubation** — Instilling methylene blue mixed with normal saline to evaluate the patency of the fallopian tubes

   d. **Conization** — Excision of a cone of tissue

   e. **Cystocele** — Herniation of the bladder into the vaginal canal

   f. **Dilation** (dilatation) — Act of stretching or enlarging an organ or part of the body

   g. **Dysplasia** — Abnormal growth or development

Information Sheet

h. **Endometriosis** — Presence of functioning endometrial tissue in places where it is not normally found

i. **Enterocele** — Herniation of the cul-de-sac of Douglas which usually contains loops of small intestine

j. **Episiotomy** — Incision into the perineum during normal labor to prevent lacerations and to facilitate delivery with less trauma

k. **Fibroma** — Encapsulated tumor consisting of fibrous connective tissue

Note: Uterine fibromas are usually benign and are removed only if they cause pain or other problems.

l. **Gamete intrafallopian transfer (GIFT)** — Infertility procedure performed through a laparoscope in which mature ova are obtained, analyzed in a petri dish, and aspirated into a special catheter followed by an evaluated and suitable sperm specimen; then another ovum is drawn into the catheter, and the ova and sperm are placed in the fallopian tube where fertilization can take place naturally

Note: Retrieval and transfer occur during one laparoscopic procedure.

m. **Gynecology** — Branch of medicine that deals with the pelvic diseases and hygiene of women

n. **Insufflation** — Using gas to inflate a cavity or to check for patency

o. **Invasive cancer** — Cancer that invades healthy tissue

p. **In vitro fertilization (IVF)** — Infertility procedure in which ova are removed, fertilized and incubated for approximately 48 hours in a laboratory setting (test tubes/petri dish), and then transferred into the prospective mother's uterus

Note: Ova are retrieved laparoscopically and then transferred two or more days later vaginally.

q. **Marsupialization** — Suturing of cyst walls to edges of wound, after evacuation, to permit the cavity to close by granulation

r. **Myoma** — Tumor containing muscle tissue

Note: A myofibroma contains both muscular and fibrous tissue.

s. **Obstetrics** — Branch of medicine that deals with prenatal care, childbirth, and postpartum care

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t. **Pneumoperitoneum** — Inflating the peritoneal cavity with gas (usually carbon dioxide) to prevent injury to abdominal structures during a laparoscopic procedure

u. **Presentation** — Manner in which the fetus is positioned in relation to the cervix

v. **Rectocele** — Herniation of the rectum into the vagina

w. **Stress incontinence** — Inability of the body to control the evacuative function because of physical stress on body parts involved

x. **Vaginal vault** — Dome or upper part of the vagina

2. **Purposes of obstetrics and gynecological surgery**

a. To diagnose abnormal conditions

b. To treat abnormal conditions

c. To relieve pain

d. To electively prevent pregnancy

e. To assist infertile couples to conceive

f. To prevent spontaneous abortion when structural defects are present

g. To abdominally deliver an infant when vaginal delivery is impossible or contraindicated

3. **Types of abortions**

a. **Missed abortion** — Product of conception (fetus) is nonliving and is retained in the uterus for 2 months or longer

b. **Incomplete abortion** — Part of the product of conception has been retained in the uterus

c. **Imminent abortion** — Patient is about to abort

d. **Spontaneous abortion** — Abortion occurring without having been induced

e. **Voluntary interrupted abortion** — Abortion performed because the patient wishes to terminate the pregnancy

Information Sheet

4. Common obstetrical complications

a. **Dystocia** — Painful and difficult labor

b. **Placenta previa** — Placenta is abnormally implanted in the lower uterine segment and may completely cover the os cervix.

c. **Abruptio placenta** — Placenta is prematurely separated from the wall of the uterus.

d. **Cephalopelvic disproportion (CPD)** — Mother's pelvis is too small to accommodate the head of the fetus.

e. **Abnormal presentations**

    (1) **Breech presentation** — Buttocks are presented first

    (2) **Transverse presentation** — Fetus is presented crosswise

    (3) **Footling presentation** — Feet are presented first

    (4) **Vertex presentation** — Upper back of the head is presented first

Note: Cesarean sections are generally indicated for b-e described above.

f. **Incompetent cervical os** — Inability of the cervix to remain closed (undilated) until the pregnancy reaches full term, thus resulting in habitual midtrimester spontaneous abortions

Note: Shirodkar procedure may be used to keep the os closed.

g. **Infertility** — Inability or diminished ability to produce offspring

Note: Infertility may be present in either or both sexual partners. The couple may undergo a battery of diagnostic procedures and possibly a variety of surgical procedures to increase their possibilities of conception such as in vitro fertilization or gamete intrafallopian transfer.

h. **Ectopic pregnancy** — Fertilized ovum becomes implanted outside the uterus (such as in the ovary, abdominal organs, cervix, outside surface of the uterus, or most commonly in the fallopian tube)

Note: This usually results in a rupture of the structure with emergency removal via a laparoscope or laparotomy.

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5. **Common gynecological complications**

   a. **Menstrual abnormalities:**

      (1) **Amenorrhea** — Absence of menstruation

      (2) **Dysmenorrhea** — Painful or difficult menstruation

      (3) **Menorrhagia** — Excessive bleeding during menstruation

      (4) **Metrorrhagia** — Active uterine bleeding at times other than during menstruation

   b. **Lesions** — Areas of pathologically altered tissue that may occur on or in all reproductive structures and may be malignant or benign (such as uterine fibromas)

   c. **Weakened musculature** — The normal supporting structures of the uterus no longer perform their functions resulting in prolapse of the uterus or various herniations (such as cystocele, rectocele, or enterocele)

   d. **Sexually transmitted diseases** — Complex of bacterial, fungal, and viral infections transmitted by sexual contact that can result in pain, infertility, or other conditions if untreated

      Examples: Syphilis, gonorrhea, trichomoniasis, genital herpes, HIV/AIDS, chlamydiae, etc.

6. **Diagnostic techniques used by gynecologists**

   a. **Colposcopy** — Directed precision biopsy in which multiple specimens may be taken from the cervix and vagina for histological examination and diagnosis

   b. **Colpotomy** — Incision into posterior cul-de-sac to facilitate diagnosis by intraperitoneal palpation, inspection of pelvic organs, or determination of free fluid, blood, or pus in the pouch of Douglas

   c. **Conization of the cervix** — Biopsy taken with a scalpel or cervitome to include the squamo-columnar junction of the ectocervix and tapered to include the endocervical canal to the level of the internal os

      Note: Multiple sections are examined by the pathologist to rule whether the disease is invasive or not.

   d. **Culdocentesis** — Insertion of a spinal needle into the cul-de-sac for aspiration of any fluid, blood, or pus collected there

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e. **Culdoscopy** — Endoscopic visualization of pelvic organs and adjacent structures in the peritoneal cavity through a small incision in the posterior vaginal cul-de-sac

Note: This is used to investigate unexplained pelvic pain, questionable pelvic masses, ovarian disorders, or infertility.

f. **Hysterosalpingography** — Insertion of a water-soluble radiopaque dye into the cervical canal to study the structure and function of the uterus and tubes in the evaluation of infertility

g. **Hysteroscopy** — Introduction of a scope vaginally to allow inspection of the interior of the uterus

Note: This is used in conjunction with a D & C.

h. **Laparoscopy** — Endoscopic visualization of the peritoneal cavity through the anterior abdominal wall after the establishment of a pneumoperitoneum

Note: This procedure, like a culdoscopy, is used to investigate unexplained pain, pelvic masses, ovarian disorders, or infertility. This procedure may enable the surgeon to avoid unnecessary pelvic surgery.

i. **Papanicolaou (Pap) smear** — Cytologic study of smears of cervical and endocervical tissue obtained by scrapings to diagnose the presence of abnormal tissue

j. **Pelvic examination** — Inspection and palpation of external genitalia, uterus, fallopian tubes, and ovaries, and speculum examination of the vagina and cervix

Note: This may be performed under anesthesia. In this case it would be called an examination under anesthesia (EUA). A Pap smear is also commonly done during a routine pelvic exam.

k. **Punch biopsy** — Removal of small pieces of tissues with cervical biopsy forceps

l. **Rubin's test** (Uterotubal insufflation) — Introduction of carbon dioxide into the uterocervical canal to check for tubal patency in the evaluation of infertility

m. **Schiller's test** — Staining the vaginal vault and cervical squamous epithelium with an iodine (Lugol's) solution to pinpoint abnormal tissues which do not stain brown as normal tissues do

Note: Further studies will then be done to diagnose the nature of the abnormal tissue.

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n. **Uterine curettage** — Tissue is obtained for histologic exam by scraping

Note: Fractional curettage indicates there will be endocervical and endometrial specimens.

7. **Abdominal procedures and descriptions**

a. **Abdominal hysterectomy** — Surgical removal of the uterus through an abdominal incision

(1) **Subtotal hysterectomy** (supracervical) — Removal of body of uterus, leaving the cervix in place

(2) **Total hysterectomy (TAH)** — Removal of entire uterus, including the corpus and the cervix

Note: This is also referred to as a pan hysterectomy.

(3) **Radical hysterectomy (Wertheim)** — En bloc dissection and removal of all pelvic lymph nodes and wide removal of uterus, tubes, ovaries, supporting ligaments, and upper vagina

b. **Cesarean section** — Surgical delivery of an infant through the abdominal and uterine wall

c. **Laparoscopy** — Endoscopic visualization of the peritoneal cavity through the anterior abdominal wall primarily used as a diagnostic procedure, but which may also be used for other procedures such as aspiration of cysts, release of adhesions, tissue biopsies, and tubal ligations

Note: When the approach is used for pelvic structures only, it is referred to as a pelvioscopy.

d. **Marshall-Marchetti-Krantz (MMK) suspension** — Suspension of the bladder to the symphysis pubis to correct stress incontinence

e. **Microscopic reconstructive surgery of the fallopian tubes** — Reconstruction of the fallopian tubes to create patency; used to reverse a tubal ligation and hopefully restore fertility

f. **Myomectomy** — Removal of fibromyomas (fibroid/muscular tumors) from the uterine wall for pressure symptoms in women desiring children

g. **Oophorectomy** — Removal of an ovary

Note: This may be unilateral or bilateral.

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h. **Oophorocystectomy** — Removal of an ovarian cyst

i. **Pelvic exenteration** — Ultraradical procedure for invasive carcinoma whose extent determines the amount removed

   (1) **Anterior exenteration** — Removal of the reproductive organs, distal part of the ureters, bladder, and vagina with resulting diversion of ureters to an ileal conduit; used for cancer of the cervix, vagina, or vulva with extension to the bladder

   (2) **Posterior exenteration** — Removal of the reproductive organs, sigmoid colon, and rectum with resulting colostomy; used for cervical carcinoma involving the rectum or advanced rectal carcinoma involving the uterus and posterior wall

   Note: Pelvic exenteration is a multilative operation which changes structure, function, body image, and sex life and is only done when there is a possibility of curing the cancer.

j. **Salpingectomy** — Removal of a fallopian tube

   Note: If both tubes are removed, it is called a bilateral salpingectomy.

k. **Salpingo-oophorectomy** — Removal of a tube and all or part of the associated ovary

   Note: When the left tube and ovary are removed, the procedure is abbreviated as an LSO, right tube and ovary as an RSO, and both tubes and ovaries (bilateral) as a BSO.

l. **Salpingostomy** — Incision of the fallopian tube to evacuate an early small tubal pregnancy and preserve the tube in women desiring children with subsequent anastomosis of tube

m. **Tubal ligation** — Interruption of fallopian tube continuity designed to sterilize the patient

   Note: This is a voluntary procedure with several techniques available. Special permission must be obtained according to state laws and hospital policy.

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8. Vaginal procedures and descriptions

a. **Anterior and posterior (A & P) repair** — Reconstruction of the vaginal walls, the pelvic floor, and the muscles and fascia of the rectum, urethra, bladder, and perineum to correct a cystocele and a rectocele and to reestablish the support of the anterior and posterior vaginal walls and thereby restore the bladder and rectum to their normal positions

Note: This is also called a colporrhaphy or a vaginoplasty.

b. **Conization of the cervix** — Excision of a cone of tissue from the cervix to remove a cancerous lesion or tissue for biopsy

c. **Dilation and curettage (D and C)** — Dilation of the os cervix and curetting of endocervical and/or endometrial tissue to obtain tissue for microscopic examination, to halt uterine bleeding, to terminate pregnancy, or to remove tissue following an incomplete or missed abortion

d. **Hysteroscopy** — Direct inspection of the interior of the uterus to diagnose or treat disease via a fiberoptic scope

e. **Laparoscopic assisted vaginal hysterectomy (LAVH)** — Removal of the uterus through an incision in the vaginal wall and pelvic cavity with the addition of an endoscope for improved visualization

Note: This allows patients with conditions such as endometriosis, nulliparity, and pelvic adhesions the benefits of a vaginal hysterectomy, yet provide the needed visualization for the surgeon.

f. **Le Fort operation** (colpocleisis) — Procedure which obliterates the vagina by denuding and approximating the anterior and posterior walls to correct uterine prolapse; generally performed only on elderly patients

g. **Marsupialization of Bartholin's duct cyst or abscess** — Removal or incision of the cyst through the vaginal outlet and drainage of the area

Note: This is oftentimes a contaminated case.

h. **Repair of fistula** — Excision of a fistula and repair of the surrounding structures

Note: Fistulas may occur in several areas of the genital tract.

i. **Shirodkar or MacDonald cerclage operation** — Postconceptional placement of a collar-type ligature at the level of the internal os to close it for incompetence of the cervix

Note: This suture material must be removed prior to vaginal delivery.

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j. **Simple vulvectomy** — Removal of the labia majora and labia minora, possibly the glans clitoris, and occasionally the perianal area with a plastic closure for treatment of carcinoma in situ of the vulva

k. **Suction curettage (Dilation and evacuation or D and E)** — Vacuum aspiration of intrauterine contents performed for termination of pregnancy or for early incomplete spontaneous abortion

l. **Trachelorrhaphy** — Removal of torn surfaces of the anterior and posterior cervical lips and reconstruction of the cervical canal (when surfaces are relatively free of infection and woman is past childbearing age)

m. **Vaginal hysterectomy** — Removal of the uterus through an incision made in the vaginal wall and the pelvic cavity

Note: This procedure may be preceded by a D and C. Other procedures which may be performed with a vaginal hysterectomy include anterior and posterior repair, urinary incontinence repair, or reconstruction of the pelvic floor.

9. **Applications of lasers for gynecological surgery**

Note: The most common types of lasers used for gynecological surgery are argon, CO_2, and Nd:YAG.

a. Ablation (removal by vaporization) of lesions (such as genital warts, genital herpes lesions, endocervical polyps, and cervical and vaginal neoplasms)

b. Eradication of Bartholin's duct abscess

c. Endometrial ablation to treat menorrhagia

d. Transecting uterine ligaments and controlling bleeding during a laparoscopic assisted vaginal hysterectomy

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10. Types of genital fistulas

a. Vesicovaginal fistula — Fistula between the bladder and vagina (most common)

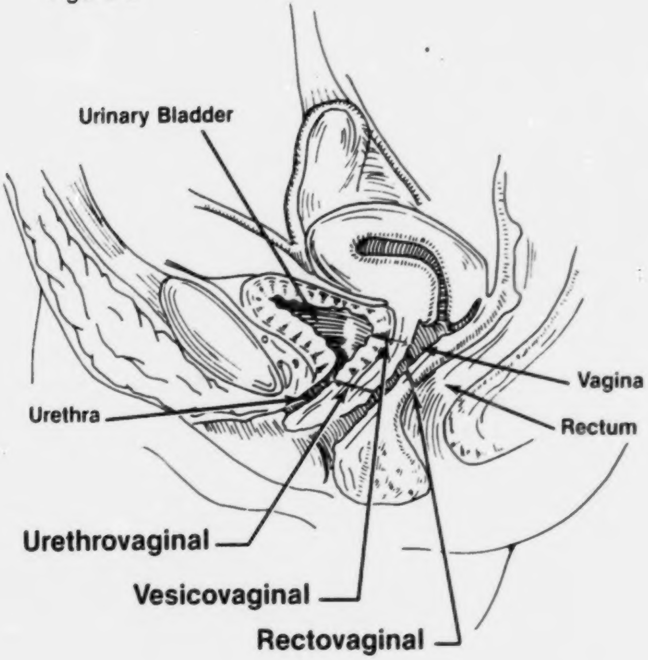
b. Ureterovaginal fistula — Fistula between the ureter and vagina

c. Urethrovaginal fistula — Fistula between the urethra and vagina

d. Rectovaginal fistula — Fistula between the rectum and vagina

Note: A fistula may also develop between the intestines and vagina.

Figure 2



11. Special features of obstetric and gynecologic surgery

a. Patient is catheterized in OR (if not before) to prevent the bladder from becoming distended during the surgical procedure and to record urinary output.

Note: The circulator or anesthetist will check the collection bag regularly for blood which could indicate injury to the bladder or ureters.

b. Spinal or general anesthesia is used.

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c. Early ambulation and use of antiembolic stockings are especially important in pelvic surgery because deep major vessels are in the operative field, lithotomy position slows circulation, and postoperative thrombosis is a serious complication.

d. Various drains such as Penrose or closed-wound suction drainage may be used to prevent hematoma or serum accumulation.

e. Vaginal procedures are usually performed with the patient in lithotomy position.

f. Instrumentation for vaginal procedures includes instruments of sufficient length for use within the vaginal canal and uterine cavity.

g. In vaginal procedures sponges should be secured on sponge forceps in deep areas. Long narrow gauze pads with tape on the end may be used for packing off abdominal viscera in vaginal procedures.

h. Medicated vaginal packing may be inserted following certain procedures.

i. In the abdominal approach, supine or Trendelenburg position is used.

j. The preparation and drapes for abdominal procedures are the same as for an abdominal laparotomy.

k. When there is a large abdominal mass or the pelvic organs are pushed from their normal relationships, ureteral catheters may be inserted prior to operation to permit easy identification of the ureters in proximity to or within the dissecting area.

Note: Inadvertent severing of ureters during operation greatly increases postoperative morbidity and mortality if the injury is not detected and corrected.

l. Instrumentation for abdominal procedures includes basic laparotomy setup with the addition of long instruments for deep manipulations within the pelvis and/or laparoscopic instruments.

m. If vaginal and abdominal surgery is indicated, a combined procedure is planned.

(1) If one procedure is diagnostic, it will be performed first.

Example: Diagnostic D & C and TAH

(2) If both procedures are non-diagnostic, the abdominal procedure will generally be performed first.

Example: TAH and A & P repair

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n. Because of the hazard of infection, separate sterile setups are used for vaginal and abdominal procedures performed concurrently.

o. Special equipment may include video cameras and monitors, lasers, microscopes, cautery unit, and fiberoptic scopes. Positioning equipment includes legholders.

12. Basic OB/GYN medications and solutions

a. **Oxytocics** (such as Pitocin® and Syntocinon)

   (1) Stimulates the uterus to contract, thus inducing labor

   (2) Also used intravenously after the delivery of an infant and placenta to cause uterine contractions to expel any remaining tissue or blood clots and to prevent bleeding

b. **Lugol's solution** — Strong iodine solution applied to vaginal tissue and the cervix to identify abnormal tissue

Note: Normal tissue will stain while abnormal tissue will not stain.

c. **Acetic acid 3%** — Used on the cervix to remove mucus and to facilitate visualization of the cervix during a colposcopy

d. **Anti-infective creams** (such as Sulfa) — Used in conjunction with vaginal packing after such vaginal procedures as cautery or laser ablation of lesions

e. **Methylene blue** — Blue colored dye used diluted in normal saline during chromotubation to check for patency. When injected intravenously, it is excreted in the urine and may be used to verify that ureters were not injured during an abdominal procedure.

f. **Solutions used with hysteroscopic examinations**

   (1) Hyskon® — Clear, viscid, sterile fluid that may be used to distend the uterus when NO CAUTERY or LASER is to be used which would cause system absorption and can result in system side effects.

   (2) Dextrose 5% (D5W)

   (3) Dextran® 70% in dextrose

   (4) Glycine — an aminoacetic solution

Note: 2, 3, and 4 may be used with laser and cautery.

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13. Specialized instruments for obstetric and gynecological surgery

Note: Other specialized instruments could be added to these lists. Complete setup for these procedures will also include basic general instruments. The choice of instruments will depend on the surgical department and surgeon's preference. When OB/GYN instruments are used in connection with lasers, they must be blackened.

a. Specialized abdominal hysterectomy instruments

(1) O'Sullivan-O'Connor retractor — Self-retaining retractor

(2) Heaney hysterectomy forceps or Heaney-Ballentine forceps — Used to clamp uterine ligaments

(3) Heaney needleholder — Used by some surgeons to suture deep in the pelvis

(4) Jorgenson scissors (long) — Used to cut around the cervix

b. Specialized vaginal instruments

(1) Auvard vaginal speculum, weighted — Used to provide adequate exposure for vaginal hysterectomies and other vaginal procedures

(2) Graves self-retaining vaginal speculum — Used for vaginal procedures where the patient is awake or that does not require wide exposure

(3) Heaney retractor — Hand-held retractor used on a vaginal hysterectomy and other vaginal procedures

(4) Jacobs vulsellum forceps/tenaculum or uterine single tooth tenaculum — Used to grasp the cervix on a D & C and other vaginal procedures

(5) Uterine sound — Used to check the depth and musculature of the uterus

(6) Hand or Hegar uterine dilators — Used to dilate the cervical os

(7) Thomas (blunt) or Sims (sharp) uterine curettes — Used to curette the endometrium on a D & C

(8) Gaylor biopsy forceps — Used to take specimens at various areas of the cervix

(9) Leep loop electrodes — Used to take one cervical biopsy at the cervical os, providing hemostasis at the same time

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(10) Uterine forceps — Polyp forceps to remove uterine polyps and uterine dressing forceps used to pack the vagina after a vaginal procedure

(11) Hysteroscope set — Obturator, vacuum cannula, scope, fiberoptic light cord, cautery electrode, grasping forceps, and scissors for performing a hysteroscopy

c. Specialized laparoscopic instruments

(1) Uterine manipulator — Inserted into the endocervical canal to allow for manipulation of the uterus during laparoscopic procedures; some require the application of suction

(2) Intrauterine cannula — Used for chromotubation

(3) Insufflation needle (Verres is one of the more common) — Used to fill the abdominal cavity with CO_2 to enlarge the abdominal space, to provide for better visualization of abdominal contents, and to prevent injury to internal organs

(4) Trocar sleeve and trocars — The larger 12mm is used for insertion of the laparoscope for viewing or an intra/abdominal camera. The smaller trocars are ports for other instrumentation such as laser, cautery, scissors, etc.

(5) Laparoscopic accessory instruments — Scissors, graspers, loop applicators for applying sterilization bands on fallopian tubes, cautery or laser probes, intra/abdominal camera, suture devices, etc.

(6) Silastic tubing — Used for passing CO_2 from tank to patient via insufflation needle, trocar, or scope

d. Specialized obstetrical instruments

(1) Lister bandage scissors — Used to cut the uterus during a C-section to prevent cutting into the fetus with a scalpel or sharp-ended scissors

(2) Bladder retractor (DeLee retractor) — Used to retract the bladder during a C-section

(3) Pennington forceps — Used to clamp the edges of the uterus after delivery of the infant during a C-section to control bleeding

(4) Delivery forceps/head extractor — Used to assist with the delivery of the baby's head when extraction is difficult during a C-section

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e. Adaptions for a vaginal hysterectomy

Note: For more detail refer to vaginal instruments.

(1) Auvard vaginal speculum, weighted

(2) Heaney or Sims retractors

(3) Single tooth tenaculum or Lahey vulsellum tenaculum

Note: Jorgenson scissors will **not** be used.

f. Adaptions for laparoscopic assisted vaginal hysterectomy

Note: For more detail refer to vaginal and laparoscopic instruments.

(1) Vaginal instruments are the same except a uterine manipulator may be used during the laparoscopic portion of the procedure.

(2) Basic laparoscopic instruments

(3) Multifire Endo GIA 30 stapler

(4) Laser or cautery for laparoscopic use

(5) Laparoscopic trocar of desired sizes for instrumentation such as graspers, laser, or cautery

(6) Laparoscopic camera — Provides visualization of the abdominal/pelvic contents

Note: This is usually placed through a 12mm trocar sleeve in the left lower quadrant.

14. Procedure for a dilation and curettage (D and C)

a. With the patient in the lithotomy position, surgeon inserts a weighted speculum into the vaginal outlet and grasps the cervix with a tenaculum.

b. Surgeon carefully introduces a graduated sound into the cervix to determine the depth and direction of the uterine cavity and therefore prevent perforation during the procedure.

Note: If the D & C and hysteroscope are being used together, the scope will be examined at this point in the procedure.

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c. Surgeon uses curette of choice to obtain an endocervical tissue specimen.

d. Surgeon passes endocervical specimen to technologist. Two specimens (endocervical and endometrial) are usually taken and must be kept separate and labeled as such.

e. Surgeon slowly dilates the cervix using Hegar or Hanks uterine dilators.

f. Surgeon places a Telfa strip over the speculum.

g. Surgeon gently curettes uterus, allowing the endometrial specimen to collect on the Telfa.

Note: Several types and sizes of curettes should be available.

h. Surgeon passes endometrial specimen to technologist, and removes the speculum.

i. Surgeon or scrub person dresses perineum with a perineal pad.

15. Procedure for the repair of a cystocele and rectocele (anterior and posterior repair)

Note: Anterior repair is indicated for cystocele and posterior repair for rectocele.

a. Patient is placed in the lithotomy position, prepped, and circulator performs a straight catheterization.

b. Surgeon inserts a weighted speculum into the vaginal outlet, grasps the cervix with a tenaculum, and brings it forward.

c. Surgeon makes an incision in the anterior vaginal wall.

d. Incision edges are grasped with several clamps and retracted.

e. Surgeon deepens the incision with sharp and blunt dissection, and advances the incision through the vaginal wall and into the fascia that lies behind it using additional clamps as needed.

Note: The assistant may be required to retract the bladder upward with a lateral retractor during the dissection.

f. When bladder neck is reached, surgeon places several absorbable sutures, size 0, through the fascia, thus tightening the tissue to prevent the bulging.

g. Surgeon excises the vaginal mucosa, and approximates the vaginal walls with absorbable sutures to complete the anterior repair.

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h. To begin the posterior repair, surgeon places two Allis clamps on each side of the vaginal outlet on the posterior side.

i. Assistant offers traction with the clamps while surgeon makes a transverse incision in the mucosa.

j. Surgeon deepens the incision with curved Mayo or Metzenbaum scissors to the level of the rectum.

k. To correct the bulging of the rectum, surgeon brings the levator muscles together with interrupted absorbable sutures, size 2-0.

l. Surgeon excises the excess vaginal mucosa, and reconstructs the vaginal wall with interrupted absorbable sutures, size 2-0 swaged to a small needle.

m. Surgeon usually inserts a Foley or suprapubic catheter, and dresses the vagina with medicated packing.

16. Procedure for a vaginal hysterectomy

a. Patient is placed in the lithotomy position, prepped, and bladder is drained.

b. Surgeon grasps the cervix with a uterine tenaculum, and makes a circular incision around the cervix using the knife or curved Mayo scissors.

c. Surgeon double-clamps, divides, and ligates the first set of ligaments with absorbable suture ligatures of size 1 or 0 mounted or swaged to a heavy tapered needle.

d. Surgeon picks up the posterior peritoneum with toothed tissue forceps and incises it with the knife or scissors.

e. Surgeon detaches the peritoneal attachment to the bladder with Mayo scissors.

f. Surgeon continues mobilization of the uterus using long tissue forceps and long dissecting scissors.

Note: Assistant may retract the bladder upward with a Sims or Heaney retractor.

g. When uterus is mobilized, surgeon delivers it to the technologist as a specimen.

h. Surgeon reperitonealizes the bladder, closes the peritoneum, inserts a Foley catheter, and may dress the wound with a perineal pad.

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17. Procedure for an abdominal hysterectomy

a. Patient is placed in supine position, prepped abdominally and vaginally, and a Foley catheter is inserted.

b. Surgeon incises abdomen using a lower midline incision or Pfannenstiel incision, and deepens the incision through the subcutaneous tissue with the deep knife or electrosurgical pencil.

c. Surgeon nicks fascia with the knife, incises with curved Mayo scissors, grasps fascial margin with two or more Kocher clamps, and separates fascia from underlying muscle using blunt dissection.

d. Surgeon divides the muscle layer manually.

e. Surgeon nicks peritoneum with the knife, lengthens with Metzenbaum scissors, and places in wound a self-retaining retractor such as O'Connor-O'Sullivan or Balfour.

f. Surgeon packs bowel away from the uterus with moist lap sponges.

g. Surgeon isolates the uterus by severing it from the uterine ligaments, ovaries, and fallopian tubes by double-clamping, dividing, and ligating with heavy gauge (size 1 or 0) absorbable sutures.

Note: Technologist must consult the surgeon's preference card because there are several types of clamps which may be used including Heaney, Ochsner, and Kocher. Adequate clamps of the surgeon's choice should be available on the Mayo stand.

h. Surgeon separates the uterus and the bladder using Mayo scissors and long tissue forceps by dissecting the peritoneal covering away from the bladder.

Note: This is called the bladder flap and will be reattached (reperitonealized) later.

i. Once the bladder has been separated from the uterus, surgeon continues mobilization of uterus.

j. Surgeon places long Allis or Kocher clamps around the margin of the vaginal cuff, and then divides it from the vagina using long scissors or the long knife to completely free the uterus.

k. Surgeon passes uterus to technologist as a specimen and places all instruments that have come in contact with the cervix or vagina in the designated basin.

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l. Surgeon closes vaginal vault usually with the same type of suture used on the uterine ligaments while a sponge count in taken.

m. Surgeon reperitonealizes the bladder flap with 2-0 or 3-0 absorbable swaged suture.

n. Surgeon closes the layers of the abdomen using sutures of choice.

Note: All medical facilities have policies that outline when and what items need to be counted.

18. Procedure for a laparoscopy

a. Patient is placed in a modified lithotomy position with lowered stirrups, is vaginally and abdominally prepped, and the bladder is drained.

b. Technologist gloves surgeon.

c. Surgeon inserts uterine manipulator into the cervix.

Note: There are two basic types of manipulators. One requires suction tubing attached to the manipulator, and the other type attaches to a tenaculum placed in the cervix.

d. Once the manipulator is in place, circulator removes surgeon's gloves, and technologist gowns and gloves the surgeon.

e. Surgeon makes a small nick in the abdominal wall close to the umbilicus.

Note: Two towel clips may be used to grasp the abdominal wall and elevate it above the viscera.

f. Surgeon inserts an insufflation needle (such as Verres) through the incision and attaches a 10-cc. syringe filled with saline solution so the surgeon can aspirate to make sure that a blood vessel has not been punctured.

g. Surgeon attaches a length of flexible tubing to the needle while one end of the tubing is passed to the circulator, who connects it to the insufflator.

h. Circulator activates the insufflator and the abdomen is slowly filled with carbon dioxide which creates a pneumoperitoneum.

i. When sufficient gas has entered the abdomen, surgeon withdraws the needle.

j. Surgeon inserts the large trocar and sleeve through the incision, removes the trocar, and leaves the sleeve which will receive the fiberoptic laparoscope.

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k. Technologist dips scope in hot water or antifogging solution or wipes the lens with soap so the scope's lenses do not fog.

l. Surgeon inserts the laparoscope into the sleeve and connects the light source cable.

Note: If an external camera is to be used, it is inserted into a sterile camera cover and then the camera is attached to the viewing end of the laparoscope.

m. Surgeon examines the abdominal contents for disease or injury, and then performs whatever additional procedure is decided upon, if needed.

Note: If a tubal ligation or oophorocystectomy is performed, a second incision will be made to allow for the introduction of accessory equipment such as the electrosurgical pencil or biopsy forceps. The location of this second incision will depend on the specific procedure needed.

n. Surgeon allows gas to escape through the sleeve, removes the sleeve, closes the incision(s) with subcuticular absorbable suture, and dresses with adhesive bandages (Band-Aids®).

19. Differences between types of hysterectomies

a. Abdominal hysterectomy (compared to vaginal hysterectomy)

(1) Provides better exposure

(2) Allows for exploration of abdominal organs, especially if cancer is suspected

(3) Allows for easier removal of the tubes and ovaries (and appendix) at the same time

(4) Is a cleaner procedure since it is not near the anal area

(5) Is the operation of choice for leiomyomata, adenomyosis, and uterine cancer

(6) Is indicated for fibroid tumors that may be too large to remove vaginally

b. Vaginal hysterectomy

(1) Leaves no visible incision scar

(2) Procedure requires least amount of time

(3) Recovery period requires less time

Information Sheet

(4) Is indicated for prolapse of the uterus

Note: A vaginal hysterectomy is indicated for prolapse of the uterus because you do not want to pull the prolapsed part back into the abdominal cavity since it is dirty.

c. Laparoscopic assisted vaginal hysterectomy

(1) Allows gynecological conditions that were once thought to be indications for an abdominal hysterectomy to be taken care of with the use of a laparoscope so that uterus can be removed vaginally

(2) Allows for visualization of abdominal organs

(3) Leaves minimal scars at puncture sites

(4) Recovery period requires less time (same as for a vaginal hysterectomy)

(5) Procedure takes longer (than abdominal or vaginal hysterectomy)

(6) Cost is higher (than abdominal or vaginal hysterectomy)

(7) Postoperative pain and complications are less than with an abdominal hysterectomy and the same as vaginal hysterectomy

20. Indications for a cesarean section

a. Abnormal presentations (breech, transverse, etc.)

Note: Occasionally abnormal presentations can be repositioned or rotated into cephalic presentations capable of vaginal delivery.

b. Abruptio placenta

c. Carcinoma of the cervix

d. Cephalopelvic disproportion (CPD) (also called fetopelvic disproportion)

Note: With this condition, vaginal delivery would be very difficult or impossible.

e. Cervix will not dilate

f. Fetal distress

Note: The fetus is in trouble and must be delivered as soon as possible. The cause may or may not be known.

Information Sheet

g. Habitual death of the fetus during the course of labor (repeated stillbirths)

h. Placenta previa

i. Preeclamptic toxemia in patients where difficult labor is anticipated

Note: This is a toxemia of late pregnancy characterized by hypertension, albuminuria, and edema, but without convulsions.

j. Presence of sexually transmitted diseases (STD) such as genital herpes that could be transmitted from the mother to the fetus during vaginal delivery

Note: Many STD are transmitted to the fetus in utero. A cesarean section will not prevent transmission if the fetus is already infected. However, when the fetus's infection status is unknown, a cesarean section may be used as a preventive measure.

k. Previous cesarean section

Note: The uterine wall is weakened from the previous incisions, and there is a danger of the uterus rupturing. However, the surgeon may allow patients meeting specified protocol to attempt to deliver vaginally.

l. Prolapse of the umbilical cord

Note: This is a protrusion of the umbilical cord ahead of the presenting part of the fetus in labor which can strangle the fetus. This presents an extreme emergency.

m. When other abdominal surgical procedures are scheduled such as hysterectomy or oophorectomy

21. Procedure for a cesarean section

a. Patient is placed in the supine position (right hip may be elevated). Patient will either be prepped and then anesthetized with general, or anesthetized with spinal and then prepped.

Note: If a general anesthesia is employed, the skin prep and draping takes place before induction so that the fetus will receive as little anesthetic as possible across the placental barrier.

b. Surgeon enters abdomen through a lower midline or Pfannenstiel incision, divides tissues, and incises the peritoneal covering of the bladder to expose the uterus.

Note: As soon as the uterus is exposed, the technologist must be ready with dry lap sponges, bulb syringe, and suction with the suction tip detached so that amniotic fluid can be quickly evacuated from the field.

Information Sheet

c. Assistant retracts the bladder downward with a bladder retractor.

d. Surgeon nicks the uterus with the deep knife and extends the incision using sharp or blunt dissection. Suction must be immediately available and bladder retractor is removed.

e. Assistant pushes firmly on the patient's upper abdomen while the surgeon grasps the newborn's head and rotates it upward.

f. Surgeon delivers newborn's head and suctions newborn's airways with the bulb syringe.

g. Surgeon delivers the newborn's body from the wound and places it on the mother's abdomen.

h. Surgeon places two clamps across the umbilical cord and divides with bandage scissors.

i. Cord blood samples are taken (usually two tubes).

j. Surgeon hands newborn over to the circulator or the pediatrician who attends to the newborn, places it in a previously warmed crib, and takes it to the nursery.

Note: The newborn's condition, including heart rate, respiration, muscle tone, color, and response to stimuli, is tested one minute after birth and is given an Apgar score of 0-10. Those infants with low scores require immediate attention if they are to survive. The scrubbed team must focus on the mother while the pediatric nurse and pediatrician focus on the newborn.

k. Surgeon manually removes the placenta and places it in a large basin on the field.

l. Surgeon closes uterus using preferred clamps and sutures while first closing count is taken (according to hospital policy).

m. Surgeon reperitonealizes the bladder flap.

n. Surgeon closes layers of the abdomen using sutures of choice.

Obstetrics and Gynecological Surgery
Unit 5

Student Supplement 1—Review Anatomy of the Female Reproductive System

Name ______________________ Date ______________

Directions: Identify the following structures of the female genitalia (internal and external), and place your answers in the blanks provided.

a. ______________________

b. ______________________

c. ______________________

d. ______________________

e. ______________________

f. ______________________

g. ______________________

h. ______________________

Figure 1 -- Internal Female Genitalia

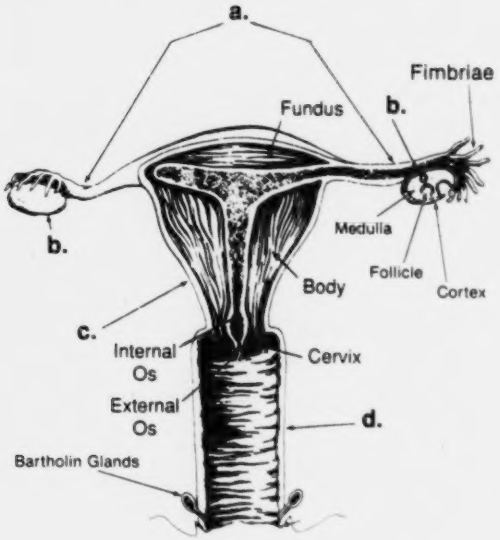
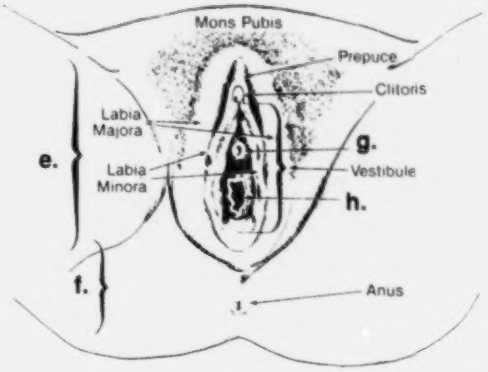

a.
Fimbriae
Fundus
b.
b.
Medulla
Follicle
Cortex
Body
c.
Internal Os
Cervix
External Os
d.
Bartholin Glands

Figure 2 — External Female Genitalia


Mons Pubis
Prepuce
Clitoris
Labia Majora
g.
e.
Labia Minora
Vestibule
h.
f.
Anus

Obstetrics and Gynecological Surgery
Unit 5

Student Supplement 2—Review Concepts of Obstetrics and Gynecological Surgery

Name ______________________________ Date ____________________

Directions: Select the best answers for the following questions or incomplete statements concerning obstetrics and gynecology. Place your answers in the blanks provided.

_____ 1. The instrument used to measure the depth of the uterus during a dilation and curettage is a

- a. Sim's curette
- b. Jacob's forceps
- c. Uterine probe
- d. Uterine sound

_____ 2. An iodine staining of the cervix to determine abnormal cervical cell growth is called a

- a. Rubin's test
- b. Papanicolaou smear
- c. Schiller's test
- d. Rinne test

_____ 3. Closing the internal os of an incompetent cervix with a ligature of tape is called

- a. Manchester
- b. Wertheim
- c. Shirodkar
- d. Le Fort

_____ 4. Pneumoperitoneum is effected by instilling _____ into the peritoneal cavity.

- a. Carbon dioxide
- b. Oxygen
- c. Helium
- d. Nitrogen

_____ 5. A procedure done on young women who evidence benign uterine tumors but who wish to preserve fertility is a

- a. Subtotal hysterectomy
- b. Wertheim procedure
- c. Myomectomy
- d. Le Fort procedure

Student Supplement 2

______ 6. A radial procedure involving the reproductive, gastrointestinal, genitourinary, vascular, and lymphatic systems is a

a. Wertheim procedure
b. Pelvic exenteration
c. Abdominal perineal resection
d. Manchester

______ 7. Radiologic investigation of the uterus and tubes is a

a. Rubin's test
b. Hysterogram
c. Hysterosalpingogram
d. Hysteroscopy

______ 8. Instruments used to close the vaginal vault in an abdominal hysterectomy must be

a. Kept separate from the setup before use
b. Considered contaminated after use
c. Noncrushing clamps
d. Kept on the Mayo stand after use

______ 9. Drugs used to contract the uterus after delivery of the placenta are called

a. Glycosides
b. Oxytocics
c. Hormones
d. Antispasmodics

______10. The removal of one ovary is referred to as

a. Unilateral salpingectomy
b. Conization
c. Bilateral myomectomy
d. Unilateral oophorectomy

______11. Reconstruction of the cervical canal is called

a. Cervicectomy
b. Trachelorrhaphy
c. Vulvectomy
d. Cerclage

Student Supplement 2

______12. Lugol's solution is primarily

a. Iodine
b. Saline
c. Calcium
d. Carbon

______13. Large glands located on either side of the distal vagina in the labia majora are the

a. Skene's glands
b. Para-urethral ducts
c. Bartholin's glands
d. Cowper's glands

______14. A herniation of the cul-de-sac of Douglas is a/an

a. Cystocele
b. Rectocele
c. Hydrocele
d. Enterocele

______15. A vesicourethral abdominal suspension for stress incontinence is known as a

a. Le Fort
b. Wertheim
c. Marshall-Marchetti-Krantz
d. Shirodkar

______16. The most common female genital fistula is a/an

a. Vesicovaginal
b. Ureterovaginal
c. Urethrovaginal
d. Rectovaginal

______17. Direct visualization of the pelvic organs through the pouch of Douglas is called

a. Laparoscopy
b. Hysteroscopy
c. Culdoscopy
d. Peritoneoscopy

______18. Papanicolaou indicates

a. Removal of small pieces of cervix for exam
b. Cytologic study of cervical smear
c. Staining of the cervix for study
d. Direct visualization of the pelvic organs

______19. Abnormal uterine bleeding at irregular intervals is

a. Amenorrhea
b. Menorrhagia
c. Metrorrhagia
d. Dysmenorrhea

______20. When the upper back of the infant's head is presented first, it is called ______ presentation.

a. Vertex
b. Footling
c. Breech
d. Transverse

______21. On which of the following diagnostic procedures will there be two specimens which should be kept separate?

a. Culdoscopy
b. Schiller's procedure
c. Fractional curettage
d. Hysteroscopy

______22. Which of the following procedures done for infertility requires that the patient have at least one patent fallopian tube?

a. In vitro fertilization (IVF)
b. Gamete intrafallopian transfer (GIFT)
c. Embryo transfer
d. Laparoscopic retrieval

______23. Which of the following is NEVER used on a hysteroscopy involving laser or cautery because of the increased possibility of systemic toxic effect?

a. Hyskon®
b. D5W
c. Glycine
d. Dextran®

Student Supplement 2

______24. Which of the following is NOT needed on a vaginal procedure?

a. Sims or Heaney retractor
b. Tenaculum, single or multitoothed
c. Auvard or Graves speculum
d. Jorgenson scissors

______25. Which of the following is NOT used on a c-section?

a. Lister bandage scissors
b. Bladder retractor
c. Pennington forceps
d. O'Sullivan-O'Connor retractor

______26. Which of the following is NOT a type of laser commonly used on gynecological surgical procedures?

a. Argon
b. CO_2
c. Nd:YAG
d. ANSI

______27. Which of the following statements is FALSE regarding laparoscopic assisted hysterectomies?

a. It allows for better visualization of vital abdominal structures than a vaginal approach.
b. The length of time of the procedure is about the same as for an abdominal hysterectomy.
c. The cost of the procedure itself is more than for a vaginal or abdominal hysterectomy.
d. The recovery time is about the same as for a vaginal hysterectomy.

Obstetrics and Gynecological Surgery
Unit 5

Assignment Sheet 1—Determine Needs for Given Obstetrics and Gynecological Surgery Cases

Name ______________________ Overall Rating ____________

Evaluation criteria	**Rating**
Answers are appropriate	______
Drawings are accurate	______

Directions: Read each of the following cases, and fill in the blanks with the appropriate information required. Refer to the information sheets as needed.

Case A: You are assigned to set up and pass on a D & C on a 42-year-old female with excessive bleeding and spotting between regular menstrual cycles.

1. The diagnostic term(s) used to describe your patient's condition is/are __________
2. Your patient will be put in what position for the procedure? __________
3. What type of prep will be done? __________
4. What type of anesthesia may be used? __________
5. What special consideration will have to be given to the specimen(s)? __________

   ____

Assignment Sheet 1

6. Draw a usable back table setup for this procedure. Instruments may be drawn or their names written in.

Case B: You are assigned to scrub, setup, and pass on an abdominal hysterectomy on a 59-year-old female.

1. What position will be used for this procedure? ____________________
2. What are two special considerations concerning the prep(s)?

   a. ____________________

   b. ____________________

3. What are the two possible incision sites for this procedure?

   a. ____________________

   b. ____________________

4. What special consideration should you follow concerning instruments used in the area of the cervix? ____________________

Assignment Sheet 1

5. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in. (Make sure you include basic laparotomy instruments that will be used.)

Case C: You are assigned to set up for a repeat c-section, BSO, on a 34-year-old female.

1. List at least 3 possible reasons for this procedure.

   a. ____________________

   b. ____________________

   c. ____________________

2. What is the position for this procedure? ____________________

3. What type of anesthesia may be used? ____________________

4. Describe at least two special considerations for this procedure.

   a. ____________________

   b. ____________________

Assignment Sheet 1

5. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Genitourinary Surgery
Unit 6

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match various genitourinary procedures with the correct descriptions, determine needs for selected urological patients and procedures, and insert catheters in female and male patients. The student should demonstrate these competencies by completing the assignment and job sheets and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to genitourinary surgery with their correct definitions.
2. Match diseases and anomalies of the urinary tract with the correct definitions.
3. Match diagnostic procedures and laboratory tests with the correct descriptions.
4. Match common types of urethral/ureteral catheters with the correct uses.
5. Select true statements concerning the characteristics of ureteral catheters.
6. Complete statements concerning the characteristics of suprapubic catheters.
7. Complete statements concerning sizing of catheters and their uses.
8. Select true statements concerning factors to consider when catheterizing a patient.
9. Distinguish between classes of genitourinary procedures.
10. List instruments, supplies, and equipment used during a cystoscopy.
11. Identify cystoscope components.
12. Complete statements concerning special considerations during cystoscopy.
13. Select duties of the surgical technologist before, during, and after a cystoscopy.
14. Complete statements concerning the procedure for a cystoscopy.

Objective Sheet

15. Select true statements concerning characteristics of a resectoscope.
16. Match operations on the penis and urethra with the correct definitions.
17. Match operations on the scrotum with the correct definitions.
18. Distinguish among the types of prostatectomies.
19. Complete statements concerning open operations on the bladder.
20. Match operations on the kidney and ureter with the correct descriptions.
21. Distinguish between incisional approaches to the kidney.
22. Select true statements concerning characteristics of an adrenalectomy.
23. Complete statements concerning kidney transplanting.
24. Complete statements concerning the procedure for circumcision.
25. Arrange in order the procedure for an orchiectomy.
26. Complete statements concerning the procedure for a transurethral resection of the prostate gland.
27. Select true statements concerning the procedure for a nephrectomy.
28. Arrange in order the procedure for a ureterolithotomy.
29. Determine needs for selected urological surgery patients and procedures. (Assignment Sheet 1)
30. Insert a straight catheter in a female patient. (Job Sheet 1)
31. Insert a straight catheter in a male patient. (Job Sheet 2)
32. Insert a Foley catheter in a female patient. (Job Sheet 3)

Genitourinary Surgery
Unit 6

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Vertical Section Through a Kidney (Objective 1)
   TM 2—Male Genitourinary System (Objective 1)
   TM 3—Female Urinary System (Objective 1)
   TM 4—Urethral/Ureteral Catheters (Objective 4)
   TM 5—Cystoscope Components (Objective 11)
   TM 6—Methods of Removing the Prostate (Objective 18)
   TM 7—Lumbar or Simple Flank Approach (Objective 21)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Review "Instructions for Evaluating Student Performance," which follows the resources in this section of the unit. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

Suggested Activities

11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of these activities.

13. Discuss and demonstrate the job sheets. Make sure all required tools, equipment, and supplies are available. Review criteria for evaluation of these activities.

Evaluation

14. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

15. Make copies of the written test. Add or modify test items as needed.

16. Give written test.

17. Compile assignment sheet ratings, job sheet ratings, and written test scores on the Unit Evaluation Form. Add any additional assignments or supplemental activities that should be part of the unit evaluation.

18. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review with students the anatomy of the genitourinary tract as outlined in MAVCC's *Anatomy and Physiology, "Urinary System."* Have students diagram the genitourinary system in color. Have the class select judges to pick the winner of the best diagram. This can reinforce **creative thinking skills, tactile learning skills, motivation**, and **self-esteem**.

2. Review with students the use of catheters in genitourinary surgery. Divide the class in half for research and debate concerning the differences between male catheterization vs. female catheterization. This will reinforce and clarify specific technology skills, involves **critical thinking skills**, and assists in **communication skills** and **group effectiveness**.

Suggested Activities

3. Show the appropriate instrumentation for genitourinary surgery. Take a field trip where students can practice actual instrument handling techniques. Give examples of how each is used. This reinforces **tactile learning skills** and **oral communication skills**.

4. Discuss complications which may arise during genitourinary surgery. Have the students write a research paper on a surgical complication and how it would best be resolved. This reinforces **writing foundation skills** and **problem solving skills**.

5. Demonstrate various formats of instrument count sheets at specific clinical sites. Discuss how counts could be handled differently from one hospital to another. Explain that the format of count sheets may vary from one institution to another. Have the students discuss their experiences with count sheets from various clinical sites. This reinforces **oral communication skills, group effectiveness skills**, and **interpersonal relation skills**.

6. Demonstrate the Ellik evacuator and Toomey syringe at the clinical site. Divide the students into two sections—one section to present the technical concepts of the Ellik evacuator, the other to present the technical concepts of the Toomey syringe. This reinforces **tactile skills, communication skills, problem solving skills**, and **creative thinking skills**.

7. Have assigned students give oral reports on their research about genitourinary surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in genitourinary surgery. **Foundation skills, communication skills, personal management skills**, and **influence skills**.

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

8. Show videos of procedures common to genitourinary surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**.

9. Have student assist in genitourinary procedures outlined in this unit during their clinical practice. Ask the students to summarize orally their experiences. This reinforces **learning and listening skills** and **group effectiveness skills**.

Suggested Activities

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Surgical Technology Examination Review*, 3rd ed. New York: Arco Publishing, Inc., 1993.

2. Atkinson, Lucy and Mary Kohn. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. New York: McGraw-Hill Book Co., 1992.

3. Association of Surgical Technologists, Inc. *Core Curriculum for Surgical Technology*, 3rd ed. Englewood, CO: 1990.

4. Ehrlich. *Medical Terminology for Health Professionals*, 2nd ed. New York: Delmar, 1993.

5. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

6. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: C. V. Mosby Co., 1991.

7. Tighe-Brooks, Shirley. *Instrumentation for the Operating Room: A Photographic Manual*. St. Louis: C. V. Mosby Company, 1993.

8. Wells, Maryann Papanier and Mary Bradley. *Surgical Instruments: A Pocket Guide*. Philadelphia: W. B. Saunders, 1993.

9. Zollinger/Zollinger. *The Atlas of Surgical Operations*, 6th ed. New York: Macmillan Publishing Company, 1988.

Suggested Supplemental Resources

1. *A.D.A.M. (Animated Dissection of Anatomy for Medicine)*. Available from:

   Software Inc.
   Kathy M. Anderson, Education Market
   1899 Powers Ferry Road, Suite 460
   Marietta, GA 30067

2. Catheters and Accessories. Write the following company for brochures and sample products that you can use in the classroom for demonstration purposes:

   American Cystoscope Makers, Inc.
   8 Pelham Parkway
   Pelham Manor, NY

Suggested Activities

3. *Urological Endoscopes: Preparation and Assembly* (videotape)

4. *Urological Endoscopes: Care and Maintenance* (videotape)

   3 and 4 are available from:

   Karl Storz Endoscopy—America, Inc.
   10111 West Jefferson Boulevard
   Culver City, CA 90232
   800-421-0837

5. *Kidney Disease*, 26-minute videotape. Covers the symptoms and some of the causes of kidney failure, explains how dialysis works, and covers the advantages and difficulties of kidney transplantation. Available from:

   Films for the Humanities & Sciences
   P.O. Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

6. *Urethral Catheterization: Techniques for the Female Patient* (Program 765), 22-minute videotape, 1982. Defines purpose and indications for intermittent and continuous catheterization; also reviews female anatomy.

7. *Urethral Catheterization: Techniques for the Male Patient* (Program 766), 19-minute videotape, 1982. Defines purpose, indications, and procedure for intermittent and continuous catheterization.

8. *Urethral Catheterization*, M042, 26-minute videotape, 1988. Demonstrates insertion for males and females and types of catheters.

   6 - 8 are available from:

   Medcom/Trainex
   P.O. Box 3225
   Garden Grove, CA 92642
   800-877-1443

9. *Extracorporeal Shockwave Lithotripsy for Kidney Stones*, DG-1750, 19-minute videotape, 1992. Outlines the use of extracorporeal shockwave lithotripsy for the treatment of renal and ureteral calculi.

10. *Surgical Alternatives to Transurethral Prostatectomy*, DG-1751, 39-minute videotape, 1992. Explores transurethral thermotherapy (microwave) and intraurethral stent insertion as alternative solutions for patients with BPH.

Suggested Activities

11. *Video Transurethral Resection: Television Replaces Monovision*, ACS-1697, 10-minute videotape, 1990. Highlights prostate resection and bladder tumor resection through a high resolution video camera.

    9 - 11 are available from:

    Cine-Med Inc.
    127 Main Street North
    Woodbury, CT 06798
    800-633-0004 or 203-263-0006

12. Kidney Diagnostic Tests Series—Explains and illustrates the major tests used to diagnose ailments of the kidneys, bladder, and urinary tract. Each video is 10-12 minutes long. Programs are intended for patient education, but can also be informative for surgical technology students. Produced by the Hospital Satellite Network.

    a. *Urodynamics Study and Cystoscopy*

    b. *Intravenous Pyelogram*

    c. *Ultrasound and Ct Scan*

    d. *Renal Angiography*

    e. *Renal Biopsy*

    This series is available individually or as a set from:

    AIMS Media
    9710 DeSoto Avenue
    Chatsworth, CA 91311-4409
    800-367-2467 or 818-773-4300

Instructions for Evaluating Student Performance

When the student is ready to perform a specific task, obtain a copy of the job sheet which may be found in either the teacher or student edition. Then observe the student performing the procedure.

Process evaluation—Place a mark in the box to the left of each designated checkpoint if the student has satisfactorily achieved the step(s) for each checkpoint area. If the student is unable to correctly complete the procedure, have the student review the materials and try again.

Suggested Activities

Product evaluation—Once the student has satisfactorily completed the procedure, rate the student product (outcome) using the criteria which have been provided as part of the job sheet. If the student's product is unacceptable, have the student review the materials and submit another product for evaluation.

Sample performance evaluation keys have been provided below. Many other keys are available. Select one rating (grading scale) which best fits your program needs.

Option A

4 - Skilled—Can perform job with no additional training.
3 - Moderately skilled—Has performed job during training program; limited additional training may be required.
2 - Limited skill—Has performed job during training program; additional training is required to develop skill.
1 - Unskilled—Is familiar with process, but is unable to perform job.

Option B

Yes—Can perform job with no additional training.

No—Is unable to perform job satisfactorily.

Genitourinary Surgery
Unit 6

Answers to Student Supplements

Student Supplement 1

a. Cortex
b. Medulla
c. Renal pelvis
d. Pyramid
e. Major calyx
f. Minor calyx

Student Supplement 2

a. Kidney
b. Ureter
c. Urinary bladder
d. Prostate gland
e. Vas deferens
f. Penis
g. Urethra
h. Scrotum
i. Testis
j. Epididymis

Student Supplement 3

a. Urinary bladder
b. Ureter
c. Uterus
d. Vagina
e. Urethra

Student Supplement 4

1. b
2. b
3. c
4. c
5. b
6. c
7. c
8. d
9. b
10. a
11. b
12. c
13. d
14. b
15. b
16. d
17. c
18. b
19. a
20. b
21. d
22. c
23. c
24. d
25. a
26. c
27. c
28. d

Genitourinary Surgery
Unit 6

Answers to Assignment Sheet 1

Case A: Cystoscopy

Components	Functions
1. Telescope	Optical system of the cystoscope. It views forward, right angle, lateral, foroblique, or retrospect
2. Obturator	Metal rod with rounded tip that inserts through the sheath to prevent abrading of the mucosal lining of the urethra as it is inserted
3. Sheath	Hollow tube that provides passageway for instruments used during cystoscopy and resection
4. Fiberoptic light cable	Cable that connects the telescope or sheath with the fiberoptic light source

Case B: Nephrectomy

1. a. Lateral
   b. Affected

2. a. Periosteal
   b. Shears

3. Specimen

4. a. Gerota's
   b. Blunt

5. Ureter(s)

6. a. Renal
   b. Absorbable
   c. Tapered

Answers to Assignment Sheet 1

Case C: Circumcision

Diagrammed Mayo — Instrument selection to be evaluated to the satisfaction of the instructor

Genitourinary Surgery
Unit 6

Answers to Written Test

1.	a.	10	e.	16	i.	11	m.	1
	b.	4	f.	3	j.	15		
	c.	9	g.	17	k.	13		
	d.	7	h.	5	l.	8		

2.	a.	9	g.	12	m.	19	s.	15
	b.	3	h.	4	n.	22	t.	28
	c.	14	i.	5	o.	21	u.	16
	d.	1	j.	11	p.	20	v.	25
	e.	2	k.	7	q.	17	w.	26
	f.	10	l.	8	r.	23	x.	24

3.	a.	6	e.	4
	b.	8	f.	1
	c.	10	g.	5
	d.	3	h.	7

4.	a.	5	d.	3
	b.	6	e.	1
	c.	4		

5.	a.	F	d.	T
	b.	T	e.	T
	c.	T	f.	F

6.	a.	Above
	b.	A closed
	c.	Third

7.	a.	Diameter of the lumen
	b.	Urethral
	c.	Ureteral
	d.	Three
	e.	Will

8.	a.	F	e.	F
	b.	F	f.	F
	c.	T	g.	F
	d.	T		

9.	a

Answers to Written Test

10. Any five of the following:

    a. Cystoscope
    b. Light source
    c. Irrigating fluid system
    d. Containers and labels
    e. Contrast medium (radiopaque dye) of choice, syringes, and needles
    f. Water soluble surgical jelly
    g. Urethral and ureteral catheters as specified

11. 1. Sheath
    b. Obturator
    c. Telescope

12. a. Cystoscopy
    b. Many
    c. Bladder
    d. Must not
    e. Hemolysis
    f. Glycine
    g. Feet

13. a, b, c, d, e, g, i

14. a. Circulator
    b. Urethra
    c. Telescope
    d. One of the following: biopsy, stents, or stone or foreign body removal
    e. Urethral catheter

15. a, c, d

16. a. 3
    b. 1
    c. 6
    d. 5
    e. 7

17. a. 2
    b. 8
    c. 9
    d. 7
    e. 3
    f. 5
    g. 4

Answers to Written Test

18. a. T
b. R
c. P
d. T
e. S
f. T
g. S or R
h. P

19. a. Cystotomy
b. Stones
c. Cystostomy
d. Partial
e. Plastic repair

20. a. 3
b. 6
c. 9
d. 5
e. 7
f. 8
g. 15
h. 2
i. 1

21. a. N
b. L
c. T

22. a. T
b. F
c. T
d. F

23. a. Iliac
b. Donor-recipient compatibility
c. Sibling or parent
d. Young
e. Rejection
f. Dialysis

24. a. Supine
b. Hemostats
c. Longitudinal, circular
d. Technologist
e. Small
f. Fine
g. Petrolatum gauze

25. a. 1
b. 2
c. 8
d. 9
e. 5
f. 4
g. 6
h. 7
i. 3

Answers to Written Test

26.
- a. Van Buren (others are available which may be given as appropriate answers)
- b. Urethra
- c. Glycine
- d. Coagulating or blend
- e. Small blood clots
- f. Bleeding points
- g. Hemostasis

27.

a.	T	d.	F
b.	F	e.	F
c.	T	f.	T

28.

a.	9	d.	8	g.	1
b.	7	e.	4	h.	6
c.	5	f.	3	i.	2

Genitourinary Surgery
Unit 6

Written Test

Name ______________________________ Date _______________ Score _____

1. Match the terms on the right with the correct definitions.

______a. Tuft of capillaries at the point of origin of the nephron

______b. Cuplike cavity which is an extension of the renal pelvis

______c. Perirenal fascia which helps to hold the kidney in place

______d. To remove without cutting into

______e. Acute failure of the kidney to perform its essential function

______f. Abnormal concentration of mineral salts found in hollow organs or ducts; also called stones

______g. Triangular space at the base of the bladder

______h. Process of removing waste products from the blood of a patient in renal failure

______i. Presence of blood in the urine

______j. Dropping or drooping of an organ or part

______k. Cystoscopic accessory used to crush bladder calculi

______l. Destruction of tissue by means of long, high-frequency electric sparks

______m. Any of numerous simple, heat-coagulable, water-soluble plasma proteins

1. Albumin
2. Albuminuria
3. Calculus
4. Calyx
5. Dialysis
6. Electrolytic
7. Enucleate
8. Fulguration
9. Gerota's capsule
10. Glomerulus
11. Hematuria
12. Impotence
13. Lithotrite
14. Normotensive
15. Ptosis
16. Renal disease
17. Trigone

Written Test

2. Match disease and anomalies of the urinary tract on the right with the correct definitions.

Note: Terms on this page match the definitions on this page only.

______a. Hardening of the kidney associated with hypertension and disease of the renal arterioles

______b. Congenital malformation in which the urethra terminates on the dorsum of the penis in the male or above the clitoris in the female

______c. Accumulation in the blood of substances ordinarily eliminated in the urine due to the inability of the kidneys to filter out waste because of damage by disease or trauma

______d. Ventral curvature of the penis caused by fibrous bands extending from the hypospadiac urethral meatus

______e. Inflammation of the urinary bladder

______f. Disease of the kidneys in which there is malfunction of the kidney tissue without inflammation

______g. Inflammation of the renal pelvis

______h. Variety of nephritis characterized by inflammation of the capillary loops in the glomeruli of the kidney

______i. Tumor of the kidney whose cells resemble those from the adrenal cortex

______j. Congenital disease in which multiple cysts gradually destroy the tissue of both kidneys

______k. Inflammation of the kidney; also called Bright's disease

______l. Presence of renal calculi

1. Chordee
2. Cystitis
3. Epispadias
4. Glomerulonephritis
5. Hypernephroma
6. Hypospadias
7. Nephritis
8. Nephrolithiasis
9. Nephrosclerosis
10. Nephrosis
11. Polycystic kidneys
12. Pyelitis
13. Pyelonephritis
14. Uremia

Written Test

Note: Terms on this page match the definitions on this page only.

______m. Downward displacement of a kidney

______n. Inflammation of the veins of the renal pelvis

______o. Condition in the uncircumcised male in which the prepuce will not retract from the glans

______p. Retraction of the prepuce which causes a painful swelling of the glans

______q. Enlarged, fluid-filled sac within the scrotum

______r. Lobulated intrascrotal cystic mass attached to the upper pole of the epididymis which is usually caused by an obstruction of the tubular system that conveys the sperm

______s. Nonmalignant enlargement of the prostate gland

______t. Childhood malignant neoplasm of the kidney which presents a firm, painless mass whose enlargement may laterally distend the abdomen

______u. Failure of testicle(s) to descend into scrotum

______v. Inability to retain urine

______w. Backflow of urine from the bladder to the ureters

______x. Twisting of the testis

15. Benign prostatic hypertrophy
16. Cryptorchism
17. Hydrocele
18. Nephrocele
19. Nephroptosis
20. Paraphimosis
21. Phimosis
22. Pyelophlebitis
23. Spermatocele
24. Testicular torsion
25. Urinary incontinence
26. Urinary reflux
27. Varicocele
28. Wilm's tumor

Written Test

3. Match diagnostic procedures and laboratory tests on the right with the correct descriptions.

______a. X-ray visualization of the ureter and renal pelvis following intravenous injection of contrast medium

______b. X-ray visualization of the kidneys and ureters following injection of contrast medium via a ureteral catheter

______c. Chemical testing of a urine specimen for sugar, protein, and/or blood

______d. X-ray visualization of the bladder following instillation of contrast medium in the bladder via a catheter

______e. Graphic representation of the bladder's response to pressure and its capacity for fluid

______f. Measures waste product of muscle metabolism which rises with kidney failure

______g. Endoscopic examination of the lower urinary tract, including urethra, bladder, and ureteral orifices by means of the cystoscope

______h. Flat-plate, abdominal x-ray visualization of the kidney, ureters, and bladder

1. Blood creatinine
2. Blood urea nitrogen
3. Cystogram
4. Cystometrogram
5. Cystoscopy
6. Intravenous pyelogram
7. KUB
8. Retrograde pyelogram
9. Urethrogram
10. Urinalysis

Written Test

4. Match the common types of urethral/ureteral catheters on the right with the correct uses.

______a. Primarily used to drain the bladder suprapubically for poor-risk patients; held in place by mushroom-shaped or winged tips

______b. Straight catheter with one eye used to empty the urinary bladder or to obtain a true sample of bladder urine

______c. Catheter with several eyes that permit better drainage of urine that contains blood clots or calcareous debris

______d. Straight catheter with an inflatable balloon that has an outlet for urine and/or irrigating fluid, an inlet for air for inflating the balloon, and an inlet for inserting irrigating fluid

______e. Angle-tipped catheter useful in curving around a partial obstruction such as an enlarged prostate gland or bladder neck

1. Coudé
2. Foley, 2-way
3. Foley, 3-way
4. Multieyed
5. Pezzer or Malecot
6. Robinson (plain)

5. Select true statements concerning characteristics of ureteral catheters by placing a "T" or "F" next to the true or false statements.

______a. Are larger in diameter and longer in length than urethral catheters

______b. Are made of woven silk, woven nylon, or other plastic materials

______c. Most are radiopaque so they will be visible on x-ray.

______d. Are usually inserted into the ureter by the urologist through a cystoscope

______e. Are used to obtain a specimen directly from the renal pelvis, to splint the ureter, or to inject dye for retrograde ureter or renal pelvis x-ray studies

______f. Are available in only one size

Written Test

6. Complete the following statements concerning characteristics of suprapubic catheters by circling the correct answers.

   a. Are placed (below, above) the pubic arch by suprapubic incision or trocar puncture

   b. Are used as (an open, a closed) drainage system

   c. Contain a (second, third) lumen for irrigation

7. Complete the following statements concerning the sizing of catheters and their uses by circling the correct answers.

   a. Catheters are sized on a French scale according to the (length of the catheter, diameter of the lumen).

   b. (Ureteral, Urethral) catheters range in size from 8-30 French.

   c. (Ureteral, Urethral) catheters range in size from 3-14 French.

   d. The French size of the catheter divided by (two, three) equals the diameter of the lumen in millimeters.

   e. The size of catheter required (will, will not) depend on the age and sex of the patient.

8. Select true statements concerning factors to consider when catheterizing a patient by placing a "T" or "F" next to the true or false statements.

   _____a. Aseptic technique does not need to be followed.

   _____b. Specific orders for a catheterization must be obtained from the patient's family.

   _____c. Correct, ordered equipment should be used to minimize patient cost.

   _____d. If patient is awake, the patient should be properly prepared by explaining the procedure, by providing for privacy, and by reassuring patient when performing the procedure.

   _____e. For straight catheterizations, the amount and appearance of urine does not need to be noted.

   _____f. If any resistance is encountered while inserting the catheter, apply force.

   _____g. Catheterization is performed by the surgeon in the majority of cases.

Written Test

9. Distinguish between classes of genitourinary procedures by placing an "X" next to the description of an open procedure.

______a. Performed through an incision

______b. Performed through an endoscope

10. List five instruments, supplies, and equipment used during a cystoscopy.

a. ______________________________

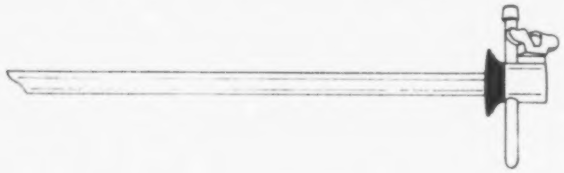
b. ______________________________

c. ______________________________

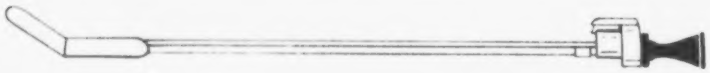
d. ______________________________

e. ______________________________

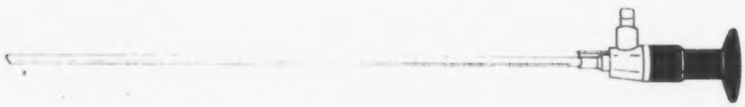
11. Identify the following cystoscope components.



a. ______________



b. ______________



c. ______________

Written Test

12. Complete the following statements concerning special considerations during cystoscopy by circling the correct answers.

    a. Cystoscopies are commonly done on (orthopedic, cystoscopy) tables which maintain the patient in the lithotomy position, receive x-ray cassettes, and allow for drainage of irrigation fluid.

    b. (Many, All) large medical facilities have a special "cysto" room equipped with the specialized equipment and supplies needed.

    c. During cystoscopy and transurethral resection, it is necessary for the (kidney, bladder) to be distended by the use of continuous irrigation to allow better visualization.

    d. The irrigating fluid (must, must not) be electrolytic.

    e. If water is used as an irrigating fluid, it will cause (shock, hemolysis).

    f. Sorbitol-mannitol and 1.5% (alcohol, glycine) are commonly used as irrigation fluids.

    g. Irrigation bottles or bags should be hung approximately 2 1/2-3 (feet, inches) above the table in order to maintain the correct amount of pressure within the bladder.

13. Select from the following list the duties of the surgical technologist before, during, and after a cystoscopy by placing an "X" in the appropriate blanks.

    ______a. Sets up instrument table and other equipment.

    ______b. Assists in positioning patient on table.

    ______c. Makes sure the dispersive (grounding) pad is properly placed.

    ______d. Opens sterile supplies for the urologist, as needed.

    ______e. Replaces irrigation bottles as they empty, and notes the number of bottles used.

    ______f. Adjusts the flow and volume of the irrigating fluid to the bladder.

    ______g. Receives any specimens from the urologist and labels them correctly.

    ______h. Assembles cystoscope for surgeon and tests and adjusts lighting.

    ______i. Transfers soiled equipment to the workroom and carries out terminal sterilization or decontamination.

Written Test

14. Complete the following statements concerning the procedure for a cystoscopy by correctly filling in the blanks.

    a. Surgeon assembles cystoscope, fitting the obturator into the sheath, testing the light, and having ________________ adjust light current to the proper brightness.

    b. Surgeon lubricates the instrument and inserts it into the patient's ________________.

    c. Surgeon removes the obturator and inserts ________________ into the sheath.

    d. Surgeon exchanges or supplements the cystoscope lens with the appropriate accessory instruments if ureteral catheterization or ________________ is necessary.

    e. Surgeon removes instrument and may insert a ________________.

15. Select true statements concerning characteristics of a resectoscope by placing an "X" in the appropriate blanks.

    ______a. Used for resections of the bladder and of urethral and prostatic tissue

    ______b. Available in two main types—McCarthy and Hall

    ______c. Consists of a telescope, cutting electrode, working element, sheath, and obturator

    ______d. Utilizes electric current generated by the electrosurgical unit to remove tissue piece by piece

    ______e. As urologist excises bits of tissue with the cutting electrode, the tissue is suctioned along with the irrigation fluid.

Written Test

16. Match operations on the penis and urethra on the right with the correct definitions.

______a. Correction of the congenital anomaly in which the urethra opens on the ventral surface of the penile shaft or on the perineum in the male, or in the female a correction of the opening of the urethra into the vagina

______b. Excision of the foreskin of the glans penis

______c. Incisional enlargement of the external urethral meatus to relieve stenosis or stricture

______d. Gradual dilation and removal of a urethral stricture to provide adequate urinary drainage

______e. Repair of a urethral stricture that fails to respond to intermittent dilation

1. Circumcision
2. Epispadias repair
3. Hypospadias repair
4. Penile implant
5. Urethral dilation and internal urethrotomy
6. Urethral meatotomy
7. Urethroplasty

17. Match operations on the scrotum on the right with the correct definitions.

______a. Excision of the tunica vaginalis of the testis to remove the fluid-filled sac

______b. Excision of a section of the vas deferens as a permanent method of sterilization or prior to a prostatectomy to prevent the spread of infection from the urethra to the epididymis

______c. Microsurgical restoration of the continuity of the divided vas deferens

______d. Ligation and partial excision of dilated veins in the scrotum

______e. Removal of a testis or testes

______f. Bilateral resection of retroperitoneal lymph nodes for treatment of testicular tumors

______g. Surgical transfer and suturing of an undescended testis into the scrotum

1. Epididymectomy
2. Hydrocelectomy
3. Orchiectomy
4. Orchiopexy
5. Radical lymphadenectomy
6. Spermatocelectomy
7. Varicocelectomy
8. Vasectomy
9. Vasovasostomy

Written Test

18. Distinguish between the types of prostatectomies by placing the designated letters in the appropriate blanks.

P — Perineal prostatectomy
R — Retropubic prostatectomy
S — Suprapubic prostatectomy
T — Transurethral resection of the prostate

______a. Most common approach

______b. Performed through an abdominal incision in the upper surface of the prostrate; incision does not go through bladder

______c. Patient is placed in extreme lithotomy position with buttocks elevated on pads to tilt the pelvis and flatten the perineum on the vertical plane

______d. Is not an enucleation of the prostate gland

______e. Performed through an abdominal incision that also goes through the bladder

______f. Requires no incision, and thus has a shorter convalescence period than other approaches

______g. Patient is placed in supine or modified Trendelenburg position, with legs apart and the weight of the torso supported by shoulder braces

______h. Has a higher incidence of impotence and urinary incontinence postoperatively

19. Complete the following statements concerning open operations on the bladder by circling the correct answers.

a. (Cystostomy, Cystotomy) — Incision into the bladder

b. Cystolithotomy — Incision into the bladder to remove (stones, lymph nodes)

c. (Cystostomy, Cystotomy) — Incision into the bladder for continuous drainage

d. (Partial, Total) cystectomy — Resection of a portion of the bladder with the lesion

e. Bladder neck operation — (Resection, Plastic repair) of the bladder neck to overcome contracture of the bladder neck caused by primary or secondary stricture

Written Test

20. Match operations on the kidney and ureter on the right with the correct descriptions.

______a. Partial excision of the kidney

______b. Incision into the kidney for temporary or permanent drainage

______c. Incision into the renal pelvis for temporary or permanent diversion of urine

______d. Removal of a large intact stone or exploration of a calyx where a small stone or fragment has slipped

______e. Removal of a kidney and the entire ureter that drains it

______f. Reconstruction of the renal pelvis

______g. Reconstruction of the ureter (usually at the ureteropelvic junction)

______h. Combined correction of a redundant renal pelvis with resection of a stenotic area of the ureter

______i. Permanent diversion of the flow of urine from the kidney, via the ureter, away from the bladder and onto the skin, usually on the abdomen

1. Cutaneous ureterostomy
2. Foley-Y pyeloureteroplasty
3. Heminephrectomy
4. Litholapaxy
5. Nephrolithotomy
6. Nephrostomy
7. Nephroureterectomy
8. Pyeloplasty
9. Pyelostomy
10. Radical nephrectomy
11. Ureterectomy
12. Ureteroileostomy
13. Ureterolithotomy
14. Ureteroneocystostomy
15. Ureteroplasty
16. Ureterostomy

Written Test

21. Distinguish between incisional approaches to the kidney by placing the designated letters in the appropriate blanks.

L — Lumbar or simple flank incision
N — Nagamatsu incision
T — Thoracoabdominal incision

______a. Modification of the simple flank incision made over the eleventh and twelfth ribs, removing a section of each

______b. With patient in lateral position, surgeon begins incision at the costovertebral angle, and running parallel to the twelfth rib extends it forward and downward between the iliac crest and the thorax

______c. With patient in lateral position, the tenth and eleventh ribs are removed, and the chest cavity is opened, collapsing the lung; rib spreaders, approximators, and chest drainage are required

22. Select true statements concerning characteristics of an adrenalectomy by placing a "T" or "F" next to the true or false statements.

______a. Adrenalectomy is the partial or total excision of one or both adrenal glands.

______b. It is performed to remove tumors of the kidney.

______c. It is performed to treat tumors elsewhere in the body that are affected by adrenal hormonal secretions, such as carcinoma of the prostate or breast.

______d. Patient may be placed in supine position for excision of one gland or in lateral position for excision of both glands.

23. Complete the following statements concerning kidney transplanting by correctly filling in the blanks.

______a. Involves the transplantation of a living related or cadaveric donor kidney into the recipient's ________________ fossa.

______b. A complete workup detailing blood type, tissue type, and lymphocyte cross match is done to determine ________________.

______c. The ideal living donor is an identical twin, although a ________________ may be a donor, if medically acceptable.

Written Test

______d. The ideal cadaver donor is __________________, free of infection and cancer, normotensive until a short time before death, and under hospital observation several hours prior to death.

______e. Patients are given immune suppressants to prevent __________________.

______f. Even after the kidney transplantation, the parent may require postoperative __________________ for a period of time.

24. Complete the following statements concerning the procedure for a circumcision by circling the correct answers.

    a. Patient is placed in the (supine, lateral) position.

    b. Surgeon places several straight (hemostats, forceps) on the edge of the prepuce.

    c. Using fine dissecting scissors, surgeon makes a (circular, longitudinal) incision through the prepuce, and then makes a (circular, longitudinal) incision through the prepuce.

    d. Surgeon passes the excised prepuce to (circulator, technologist) as a specimen.

    e. Surgeon controls (large, small) bleeders with the electrosurgical pencil.

    f. Surgeon approximates the skin edges with interrupted fine absorbable sutures swaged to a (fine, heavy) cutting needle.

    g. Surgeon dresses wound with (nonadherent pad, petrolatum gauze).

25. Arrange in order the procedure for an orchiectomy by placing the correct sequence numbers (1-9) in the appropriate blanks.

______a. Patient is placed in the supine position, prepped, and draped for a scrotal incision.

______b. Surgeon incises the scrotum over the testicle and delivers it from the wound.

______c. Surgeon may place a Penrose drain in the scrotum, and then closes the wound in layers with small absorbable sutures swaged to a fine cutting needle.

______d. Surgeon dresses wound with gauze dressing and a scrotal support.

Written Test

______e. Surgeon ligates the tissue with the knife or dissecting scissors to free the testicle.

__4__f. Surgeon places two Mayo clamps across the vas deferens and vessels.

______g. Surgeon passes the testicle to the technologist as a specimen.

______h. Surgeon ligates vas and its vessels with heavy absorbable sutures.

______i. Surgeon cauterizes or clamps and ligates small bleeders.

26. Complete the following statements concerning the procedure for a transurethral resection of the prostrate gland by correctly filling in the blanks.

    a. Surgeon inspects resectoscope and associated equipment to make sure all are in working condition, and then dilates the urethra with sounds such as ________________.

    b. Surgeon inserts a well-lubricated sheath with its obturator into the ________________.

    c. Nonelectrolytic irrigation fluid such as 1.5% ________________ fills the bladder.

    d. Surgeon begins electrodissection by alternately using the cutting and ________________ currents.

    e. Surgeon drains the bladder at several intervals to wash out prostatic tissue and ________________.

    f. When resection is completed, surgeon will inspect prostatic fossa for ________________.

    g. Surgeon removes resectoscope and inserts a Foley catheter into the bladder for urinary drainage and ________________.

Written Test

27. Select true statements concerning the procedure for a nephrectomy by placing a "T" or "F" next to the true or false statements.

______ a. Patient is placed in the lateral position with affected side up, prepped, and draped.

______ b. Surgeon makes straight incision across the flank, and divides fascia and muscle tissue with dissecting scissors and cautery.

______ c. Surgeon places a self-retaining retractor in the wound.

______ d. To mobilize the kidney, surgeon incises Grady's capsule and extends the incision with Metzenbaum scissors.

______ e. Surgeon uses sharp dissection to separate the kidney from the capsule and surrounding muscle.

______ f. Surgeon identifies and frees the ureter from its attachments by sharp dissection. Assistant uses narrow Penrose drain, umbilical tape, or vessel loops to retract the ureter.

28. Arrange in order the procedure for a ureterolithotomy by placing the correct sequence numbers (1-9) in the appropriate blanks.

______ a. Surgeon closes layers using sutures of choice and dresses the wound.

______ b. Surgeon passes stone to technologist as a specimen.

______ c. Surgeon places a Babcock clamp or stone forcep across the ureter below the stone to prevent it from moving downward.

______ d. Surgeon may close ureteral incision with interrupted absorbable sutures, or may choose to allow it to close spontaneously.

__4__ e. Surgeon places a small Penrose drain, vessel loops, or umbilical tape around the ureter above the area of the stone to prevent its migration into the renal pelvis.

______ f. Surgeon uses Metzenbaum scissors to dissect the ureter free.

______ g. Surgeon makes selected incision to enter the retroperitoneal space.

______ h. Surgeon makes a small incision over the stone using a small knife blade, and removes the stone with fine tissue forceps or stone grasping forceps.

______ i. Surgeon locates stone by manual examination.

***Permission to duplicate this test is granted.**

Genitourinary Surgery
Unit 6

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Selected Urological Surgery Patients and Procedures Rating ______

Comments: ____

____

Job Sheet 1—Insert a Straight Catheter in a Female Patient Rating ______

Comments: ____

____

Job Sheet 2—Insert a Straight Catheter in a Male Patient Rating ______

Comments: ____

____

Job Sheet 3—Insert a Foley Catheter in a Female Patient Rating ______

Comments: ____

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

***Permission to duplicate this form is granted.**

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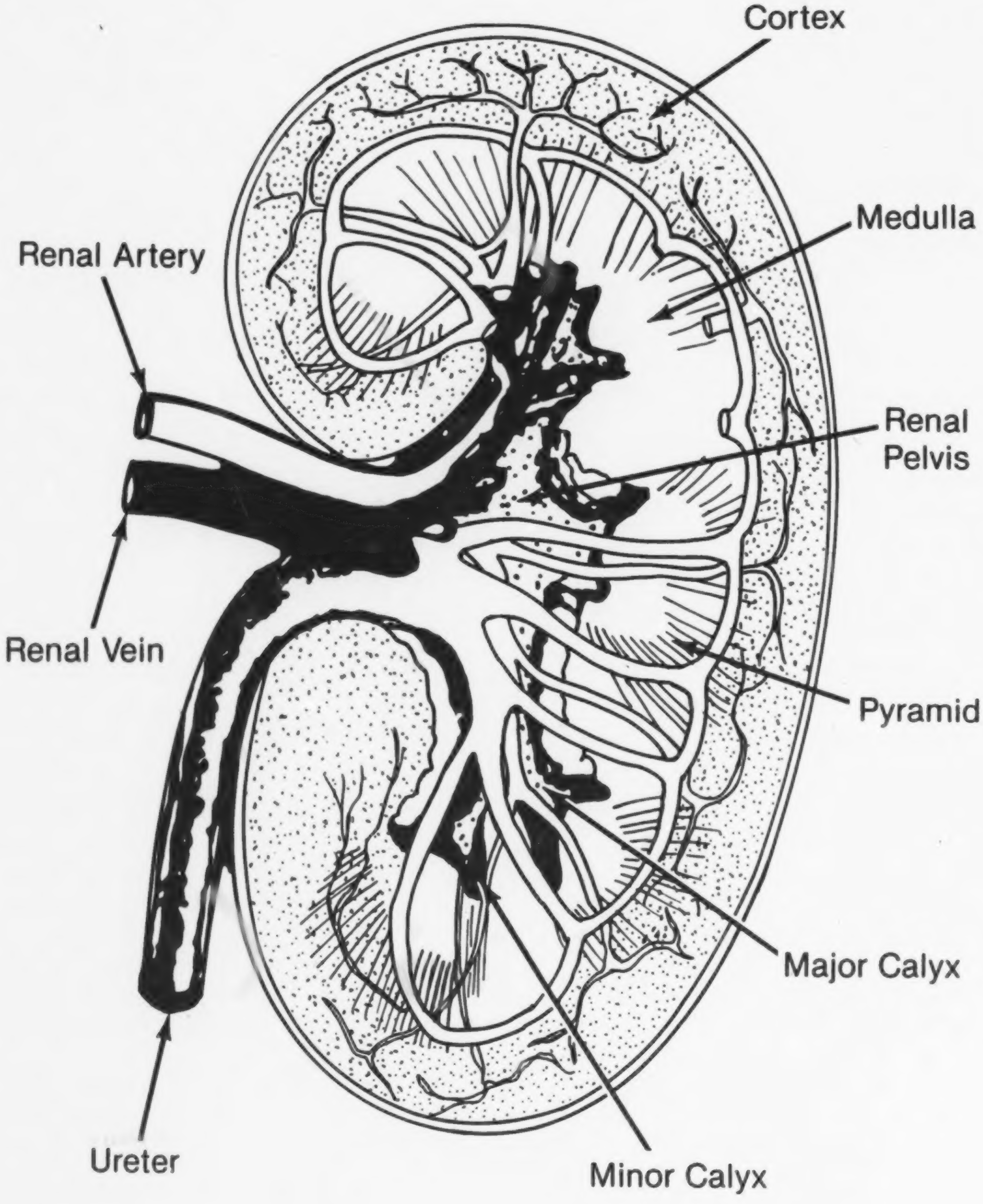
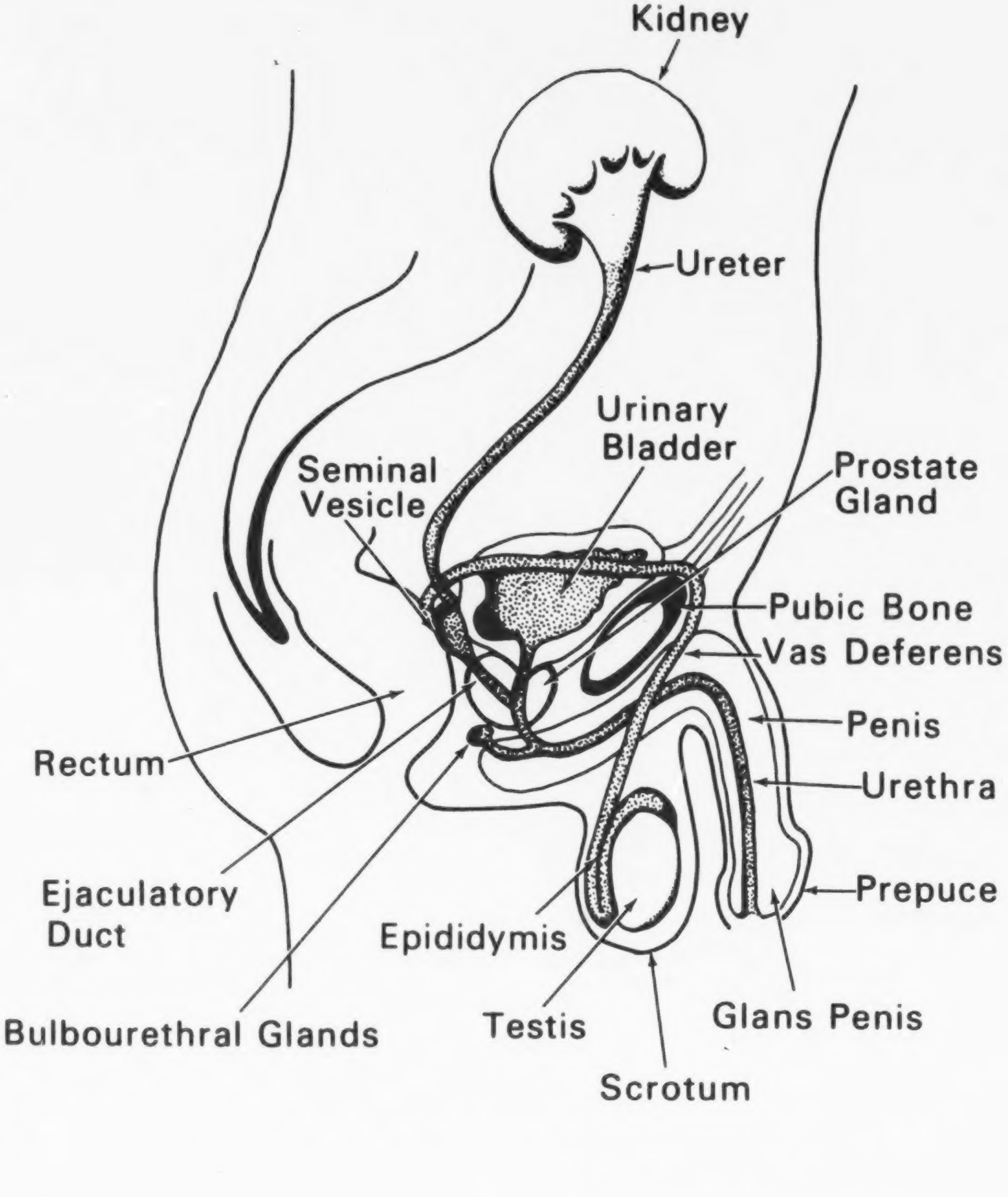
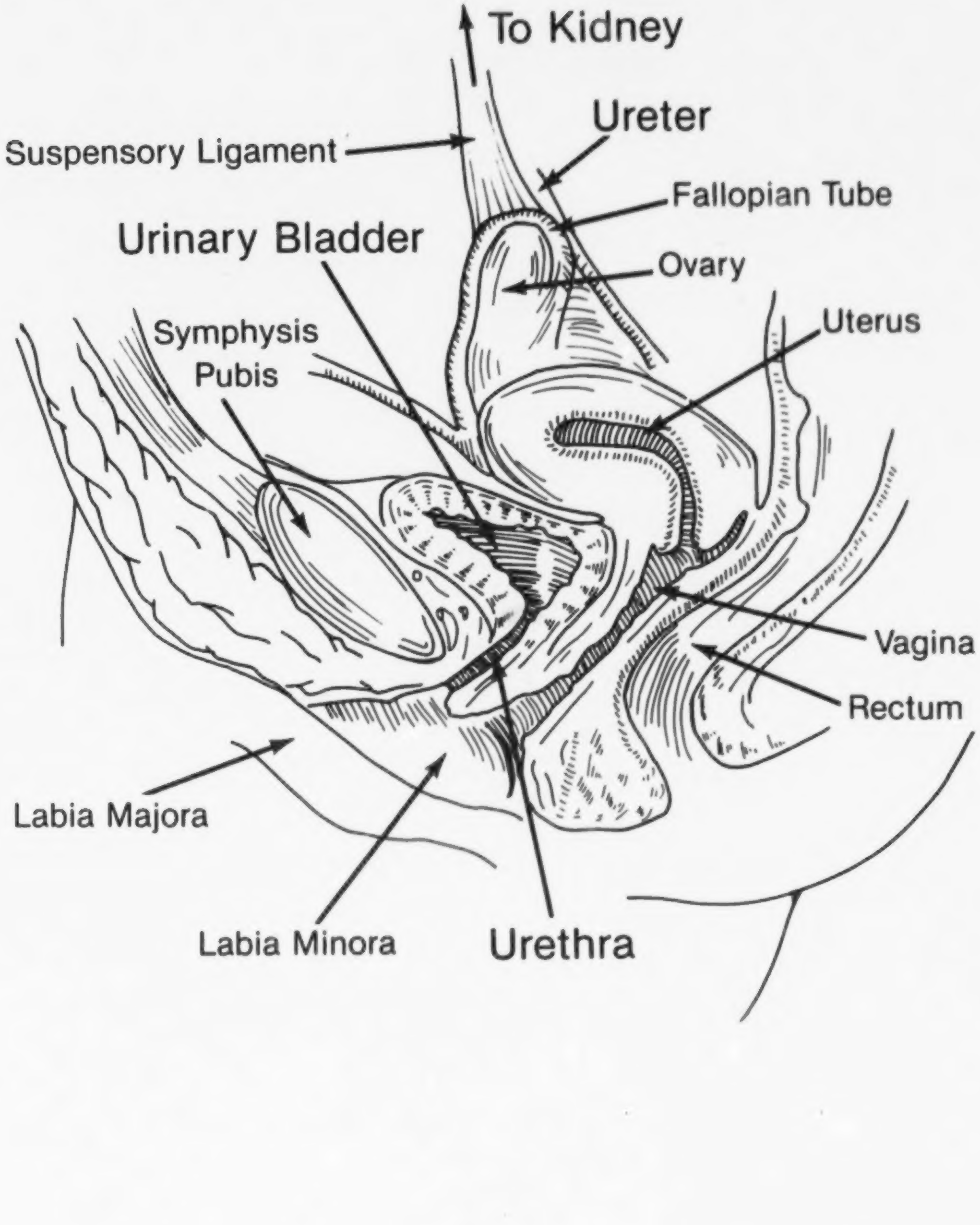
Vertical Section Through a Kidney


Cortex
Medulla
Renal Artery
Renal Pelvis
Renal Vein
Pyramid
Major Calyx
Ureter
Minor Calyx

Male Genitourinary System

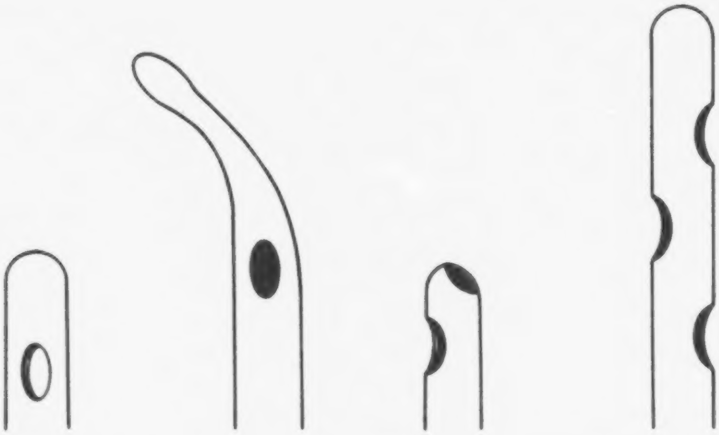

Kidney
Ureter
Urinary Bladder
Seminal Vesicle
Prostate Gland
Pubic Bone
Vas Deferens
Penis
Urethra
Rectum
Prepuce
Ejaculatory Duct
Epididymis
Bulbourethral Glands
Testis
Glans Penis
Scrotum

Female Urinary System


To Kidney
Ureter
Suspensory Ligament
Fallopian Tube
Urinary Bladder
Ovary
Symphysis Pubis
Uterus
Vagina
Rectum
Labia Majora
Labia Minora
Urethra

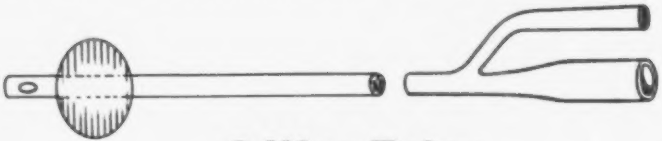
370

Urethral/Ureteral Catheters

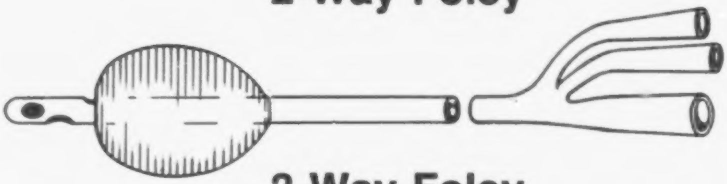


Robinson **Coudé** **Whistle** **Multieyed**

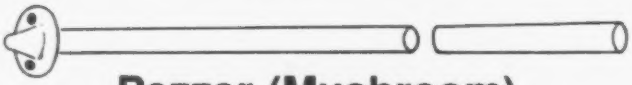
Non-Retaining



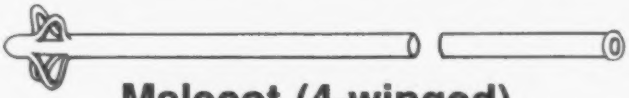
2-Way Foley



3-Way Foley



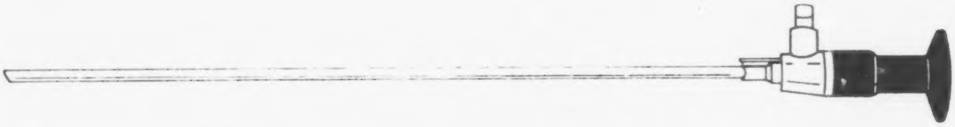
Pezzer (Mushroom)



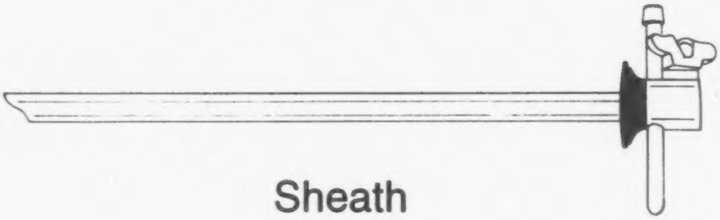
Malecot (4-winged)

Self-Retaining

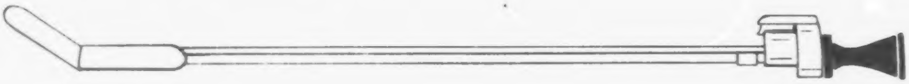
Cystoscope Components



Operating Telescope

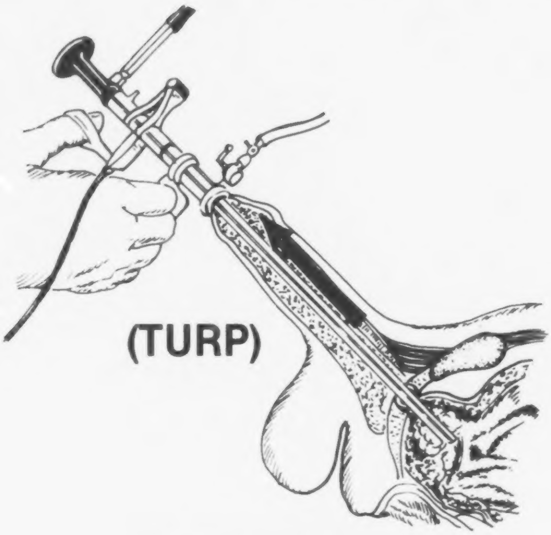


Sheath

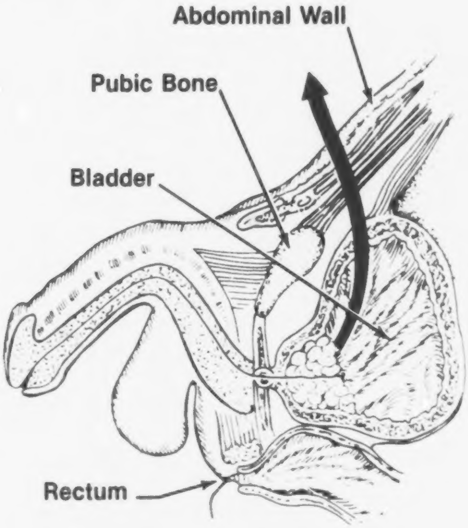


Obturator

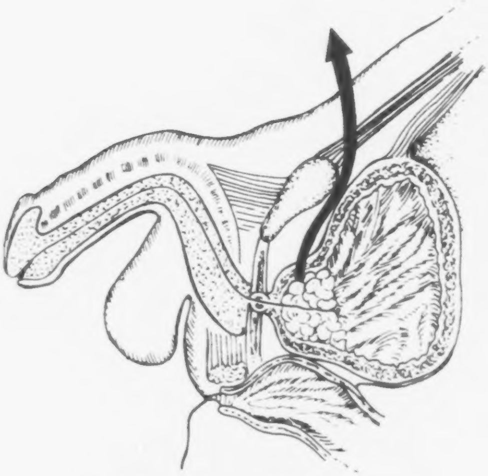
Methods of Removing the Prostate



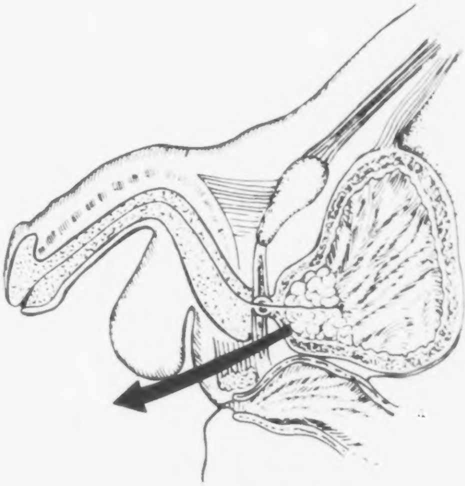
Transurethral
Resection


Abdominal Wall
Pubic Bone
Bladder
Rectum

Suprapubic
Prostatectomy

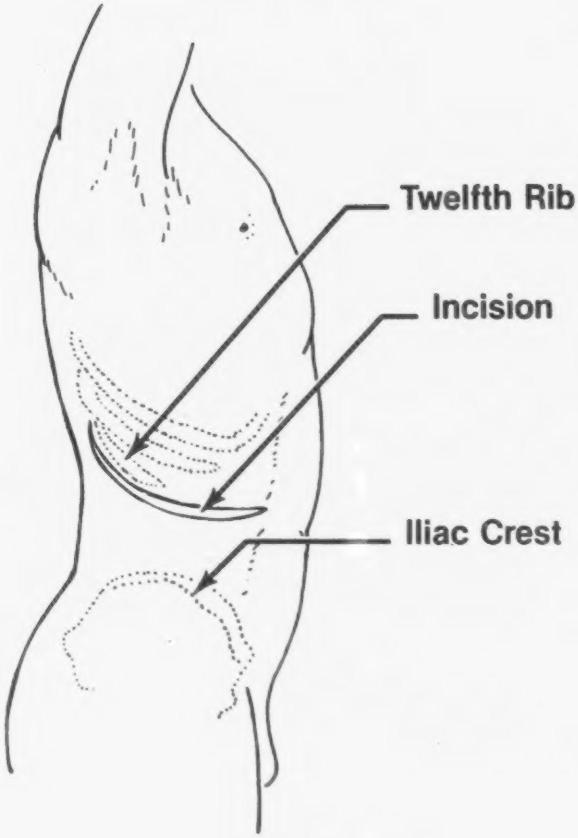


Retropubic
Prostatectomy



Perineal
Prostatectomy

Lumbar or Simple Flank Approach


Twelfth Rib
Incision
Iliac Crest

Genitourinary Surgery
Unit 6

Information Sheet

1. **Terms and definitions**

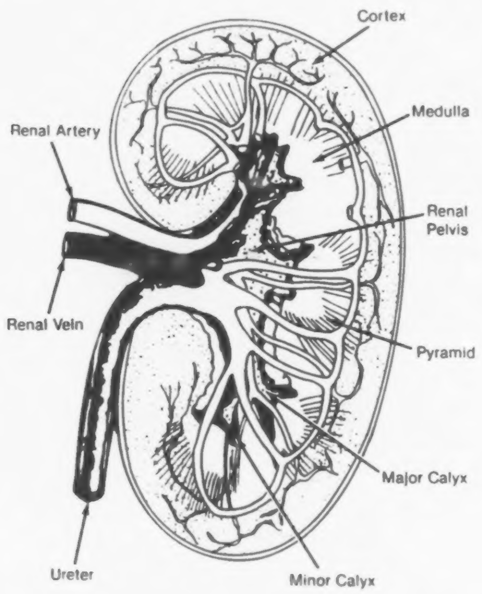
   a. **Albumin** — Any of numerous simple, heat-coagulable, water-soluble plasma proteins

   b. **Albuminuria** — Presence of albumin in the urine, often symptomatic of kidney disease

   c. **Calculus** (plural: -li)— Abnormal concentration of mineral salts found in hollow organs or ducts; also called stones

   d. **Calyx** (plural: -yces) — Cuplike cavity which is an extension of the renal pelvis

   Figure 1—Vertical section through a kidney


Cortex
Medulla
Renal Artery
Renal Pelvis
Renal Vein
Pyramid
Major Calyx
Ureter
Minor Calyx

   e. **Dialysis** — Process of removing waste products from the blood of a patient in renal failure

   f. **Electrolytic** — Capable of conducting electricity

   g. **Enucleate** — To remove without cutting into

Information Sheet

h. **Fulguration** — Destruction of tissue by means of long, high-frequency electric sparks

i. **Genitourinary surgery** — Branch of surgery that deals with the male reproductive organs and the organs of the urinary system for both sexes

Figure 2—Male genitourinary system

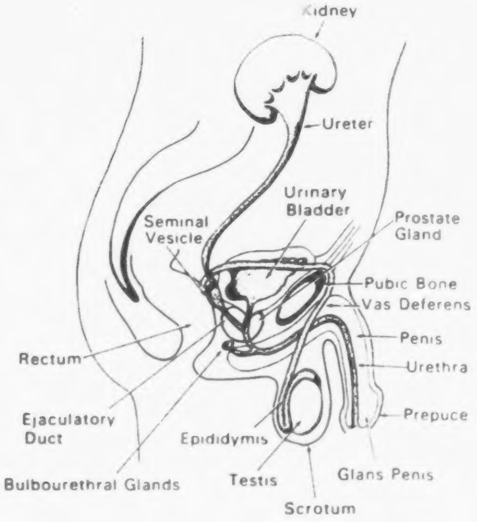
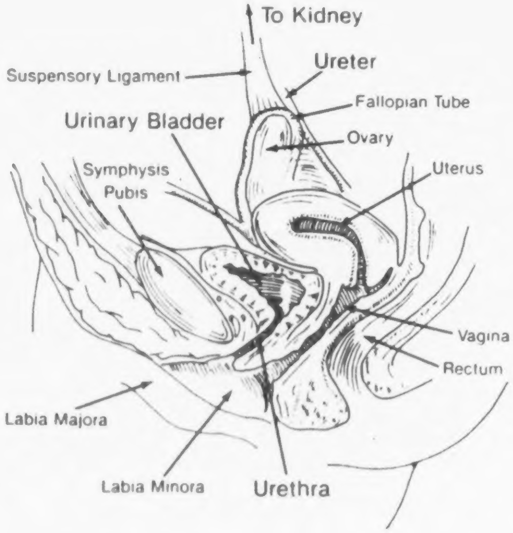

Kidney
Ureter
Urinary Bladder
Seminal Vesicle
Prostate Gland
Pubic Bone
Vas Deferens
Penis
Urethra
Rectum
Prepuce
Ejaculatory Duct
Epididymis
Bulbourethral Glands
Testis
Glans Penis
Scrotum

Figure 3—Female urinary system


To Kidney
Ureter
Suspensory Ligament
Fallopian Tube
Urinary Bladder
Ovary
Symphysis Pubis
Uterus
Vagina
Rectum
Labia Majora
Labia Minora
Urethra

j. **Gerota's capsule** — Perirenal fascia which helps to hold the kidney in place

k. **Glomerulus** (plural: -li)— Tuft of capillaries at the point of origin of the nephron

l. **Hematuria** — Presence of blood in the urine

m. **Impotence** — Inability of the male to achieve an erection for the purpose of intercourse

n. **Lithotrite** — Cystoscopic accessory used to crush bladder calculi

o. **Normotensive** — Normal blood pressure

p. **Ptosis** — Dropping or drooping of an organ or part

q. **Renal disease** — Acute failure of the kidney to perform its essential function

r. **Trigone** — Triangular space at the base of the bladder

Information Sheet

2. Diseases and anomalies of the urinary tract

a. **Benign prostatic hypertrophy (BPH)** — Nonmalignant enlargement of the prostate gland; very common with age

b. **Chordee** — Ventral curvature of the penis caused by fibrous bands extending from the hypospadiac urethral meatus

c. **Cryptorchism** (undescended testicle) — Failure of testicle(s) to descend into scrotum

d. **Cystitis** — Inflammation of the urinary bladder

e. **Epispadias** — Congenital malformation in which the urethra terminates on the dorsum of the penis in the male or above the clitoris in the female; more common in the male

f. **Glomerulonephritis** — Variety of nephritis characterized by inflammation of the capillary loops in the glomeruli of the kidney

g. **Hydrocele** — Enlarged, fluid-filled sac within the scrotum

h. **Hypernephroma** — Tumor of the kidney whose cells resemble those from the adrenal cortex

i. **Hypospadias** — Developmental anomaly in which, in the male, the urethra opens on the ventral surface of the penis or on the perineum, or in the female, the urethra opens into the vagina

Note: In the male, this is commonly accompanied by chordee, especially during erection.

j. **Nephritis** — Inflammation of the kidney; also called Bright's disease

k. **Nephrolithiasis** — Presence of renal calculi

l. **Nephroptosis** — Downward displacement of a kidney

m. **Nephrosclerosis** — Hardening of the kidney associated with hypertension and disease of the renal arterioles

n. **Nephrosis** — Disease of the kidneys in which there is malfunction of the kidney tissue without inflammation

o. **Paraphimosis** — Retraction of the prepuce which causes a painful swelling of the glans

Information Sheet

p. **Phimosis** — Condition in the uncircumcised male in which the prepuce will not retract from the glans

q. **Polycystic kidneys** — Congenital disease in which multiple cysts gradually destroy the tissue of both kidneys

r. **Pyelitis** — Inflammation of the renal pelvis

s. **Pyelonephritis** — Inflammation of the kidney and renal pelvis

t. **Pyelophlebitis** — Inflammation of the veins of the renal pelvis

u. **Spermatocele** — Lobulated intrascrotal cystic mass attached to the upper pole of the epididymis which is usually caused by an obstruction of the tubular system that conveys the sperm

v. **Testicular torsion** — Twisting of the testis

w. **Uremia** — Accumulation in the blood of substances ordinarily eliminated in the urine due to the inability of the kidneys to filter out waste because of damage by disease or trauma

x. **Urinary incontinence** — Inability to retain urine

y. **Urinary stress incontinence** — Inability to retain urine during stress such as when laughing, coughing, sneezing, lifting, or moving suddenly

z. **Urinary (vesicoureteral) reflux** — Backflow of urine from the bladder to the ureters

aa. **Varicocele** — Enlargement of the veins of the spermatic cord

bb. **Wilm's tumor** — Childhood malignant neoplasm of the kidney which presents a firm, painless mass whose enlargement may laterally distend the abdomen

Information Sheet

3. Diagnostic procedures and laboratory tests that may be required prior to genitourinary surgery

a. Diagnostic procedures

(1) **Intravenous pyelogram (IVP)** — X-ray visualization of the ureter and renal pelvis following intravenous injection of contrast medium (radiopaque dye)

(2) **Retrograde pyelogram** — X-ray visualization of the kidneys and ureters following injection of contrast medium via a ureteral catheter

Note: This is sometimes done if an IVP does not visualize the kidneys or ureters or if a patient is allergic to intravenous contrast medium.

(3) **Cystogram** — X-ray visualization of the bladder following instillation of contrast medium in the bladder via a catheter

(4) **Urethrogram** — X-ray visualization of the urethra following the injection of a contrast medium into it

(5) **KUB (Kidneys, ureters, bladder)** — Flat-plate, abdominal x-ray visualization of the kidney, ureters, and bladder

(6) **Cystoscopy** — Endoscopic examination of the lower urinary tract, including urethra, bladder, and ureteral orifices by means of the cystoscope

(7) **Cystometrogram** — Graphic representation of the bladder's response to pressure and its capacity for fluid

b. Laboratory tests

(1) **Urinalysis (UA)** — Chemical testing of a urine specimen for sugar, protein, and/or blood

(2) **Blood urea nitrogen (BUN)** — Measures the waste products of protein metabolism

(3) **Blood creatinine** — Measures waste product of muscle metabolism which rises with kidney failure

Note: Blood creatinine and blood urea nitrogen may be obtained from the BUN testing.

Information Sheet

4. **Common types of urethral/ureteral catheters**

   a. **Nonretaining catheters** — Used to empty the urinary bladder or to obtain a true sample of bladder urine

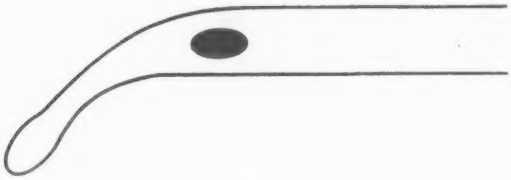
      (1) **Robinson (plain)** — Straight catheter with one eye used for the above mentioned reasons

Figure 4—Robinson

(2) **Coudé** — Angle-tipped catheter useful in curving around a partial obstruction such as an enlarged prostate gland or bladder neck

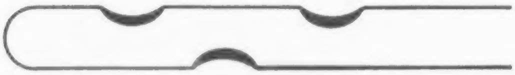
Note: May also be self-retaining.

Figure 5—Coudé



(3) **Multieyed** — Catheter with several eyes that permit better drainage of urine that contains blood clots or calcareous debris

Figure 6—Multieyed



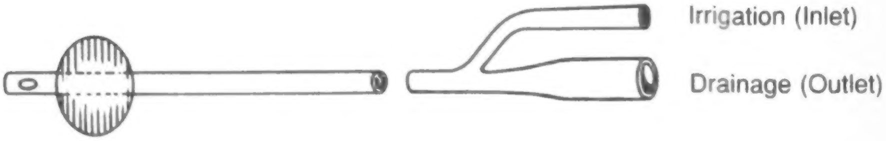
Information Sheet

b. **Self-retaining catheters** — Designed to remain in place

(1) **Two-way Foley** — Straight catheter with an inflatable balloon that provides continual bladder drainage; also aids in achieving hemostasis; has one inlet and one outlet

Note: Continual bladder drainage is commonly used for lengthy surgical procedures.

Figure 7—Two-way (double channel) Foley



(2) **Three-way Foley** — Straight catheter with an inflatable balloon that has

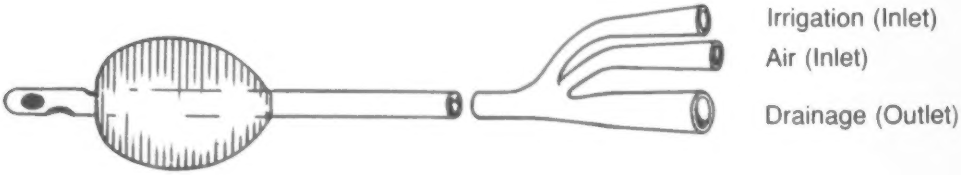
(a) An **outlet** for urine and/or irrigating fluid

(b) An **inlet** for air for inflating the balloon

(c) An **inlet** for inserting irrigating fluid

Note: The balloons after being inflated prevent these types of catheters from slipping out of the bladder. Various sizes of balloons are available, such as 5 cc, 30 cc, 75 cc, and 100 cc. The larger sizes are primarily used for hemostasis in post-transurethral resection of the prostate.

Figure 8—Three-way (triple channel) Foley



(3) **Pezzer or Malecot** — Primarily used to drain the bladder suprapubically for poor-risk patients; held in place by the Pezzer's mushroom-shaped tip or by the Malecot's winged tips; they are then taped to the abdomen.

Figure 9—Pezzer (mushroom)

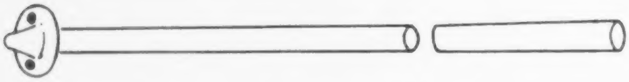
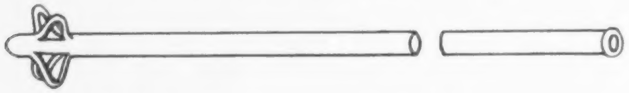


Figure 10—Malecot (2- or 4-winged)



5. **Characteristics of ureteral catheters**

   a. Are smaller in diameter and longer in length than urethral catheters

   b. Are made of woven silk, woven nylon, or other plastic materials

   c. Most are radiopaque so they will be visible on x-ray.

   d. Are usually inserted into the ureter by the urologist through a cystoscope

   e. Are used to obtain a specimen directly from the renal pelvis, to splint the ureter, or to inject dye for retrograde ureter or renal pelvis x-ray studies

   f. Are available in various styles and sizes for specific purposes

      Examples: Plain whistle tip, olive tip, cone tip

   g. If a ureteral catheter is left in place, it must be labeled right or left, taped securely in place, and connected to a collection bag.

6. **Characteristics of suprapubic catheters**

   a. Are placed above the pubic arch by suprapubic incision or trocar puncture

   b. Are used as a closed drainage system

   c. Contain a third lumen for irrigation

   d. Are available in various sizes

Information Sheet

7. **Sizing of catheters and their uses**

   a. Catheters are sized on a French scale according to the diameter of the lumen.

   b. Urethral catheters range in size from 8-30 French.

   c. Ureteral catheters range in size from 3-14 French.

   d. The French size of the catheter divided by three equals the diameter of the lumen in millimeters.

      Example: Size 18 French catheter has a lumen that is 6 millimeters in diameter—18 ÷ 3 = 6 mm

   e. The size of catheter required will depend on the age and sex of the patient.

      Note: Children generally require a size 8 or 10 urethral catheter; an adult generally requires a size 14 - 18.

8. **Factors to consider when catheterizing a patient** (Job Sheets 1, 2, and 3)

   a. Strict aseptic technique must be followed to prevent urinary tract infection.

   b. Specific orders for a catheterization must be obtained from the physician.

      Note: Many physicians try to avoid routine catheterizations of patients so be sure to check the patient's records before performing one.

   c. Equipment and lighting should be assembled before procedure to save time.

   d. Correct, ordered equipment should be used to minimize patient cost.

   e. If patient is awake, the patient should be properly prepared by explaining the procedure, by providing for privacy, and by reassuring patient when performing the procedure.

   f. For straight catheterizations, the amount and appearance of urine should be noted.

   g. If any resistance is encountered while inserting the catheter, do not force. Start over with a fresh catheter and/or obtain assistance.

   h. Catheterization is performed

      (1) By the circulator in the majority of cases

      (2) By the surgeon in difficult cases

      (3) Occasionally by the surgical technologist when required, especially on female patients, which present fewer technical problems

Information Sheet

9. **Classes of genitourinary procedures**

   a. **Open procedures** — Performed through an incision

   Examples: Cystectomy, nephrectomy, orchiectomy

   b. **Closed procedures** — Performed through an endoscope

   Examples: Cystoscopy, nephroscopy, transurethral resection of the prostate (TURP)

10. **Instruments, supplies, and equipment used during a cystoscopy**

    a. Cystoscope

    b. Light source

    c. Irrigating fluid system

    d. Containers and labels for identifying specimens with appropriate laboratory slips

    e. Contrast medium (radiopaque dye) of choice, syringes, and needles for x-ray examinations

    f. Water soluble surgical jelly (which is nonconductive) for lubricating instruments to be passed into the urethra

    g. Urethral and ureteral catheters as specified

11. **Cystoscope components**

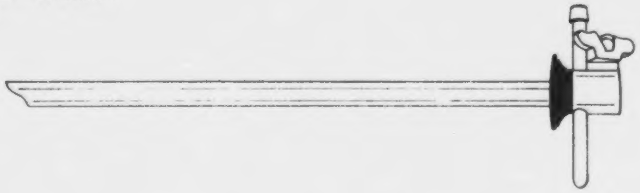
    a. **Telescope** — Optical system of the cystoscope with different angles of view available such as forward, right-angle, lateral, foroblique, and retrospect

    Figure 11—Telescope

Information Sheet

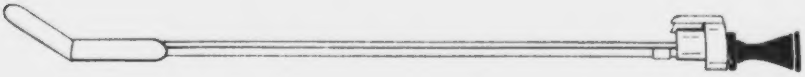
b. **Sheath** — Hollow tube which provides a passageway for the instruments used during cystoscopy and resection

Figure 12—Sheath



c. **Obturator** — Metal rod with a rounded tip inserted into the sheath and advanced so its blunt tip protrudes past the end of the sheath to prevent the sheath from abrading the mucosal lining of the urethra as it is inserted

Figure 13—Obturator



d. **Fiberoptic light cable** — Cable connecting the telescope or sheath with the fiberoptic light source

Note: The components of most endoscopes used in genitourinary surgery are similar; however, they vary in size depending on the body part to be scoped. For example, a ureteroscope is smaller in diameter and longer than a cystoscope in order to view the ureters.

12. **Special considerations during cystoscopy**

a. Cystoscopies are commonly done on cystoscopy tables which maintain the patient in the lithotomy position, receive x-ray cassettes, and allow for drainage of irrigation fluid.

b. Many large medical facilities have a special "cysto" room equipped with overhead x-ray equipment, a cystoscopy table, and storage areas for supplies and instruments.

c. During cystoscopy and transurethral resection, it is necessary for the bladder to be distended by the use of continuous irrigation to allow better visualization.

Information Sheet

d. The irrigating fluid used during cystoscopy must not be electrolytic (such as a normal saline solution) because that would cause the dissipation of electricity when the electrosurgical unit is in use.

e. Water may not be preferred as an irrigating fluid since it will be absorbed into the venous system and will cause hemolysis or breakdown of red blood cells.

f. Sorbitol-mannitol and 1.5% glycine are commonly used as irrigation fluids since they do not conduct electricity and are not harmful if they are absorbed by the body.

g. Irrigation bottles or bags should be hung approximately 2 1/2—3 feet above the cystoscopy table in order to maintain the correct amount of pressure within the bladder.

13. Duties of the surgical technologist before, during, and after a cystoscopy

a. Sets up instrument table and other equipment.

b. Assists in positioning patient on cystoscopy table.

c. Makes sure the dispersive (grounding) pad for the electrosurgical unit is on a fleshy area on the patient's skin.

d. Remains in the room at all times, unless otherwise directed by the urologist.

e. Connects the sterile ends of power equipment or suction tubing.

f. Opens sterile supplies for the urologist as needed.

g. Replaces irrigation bottles as they empty, and notes the number of bottles used.

h. Receives any specimens from the urologist and labels them correctly.

i. Assists in transferring patient from cystoscopy table to stretcher.

j. Transfers any specimens to designated area and records in log.

k. Puts away nonsterile supplies used during the procedure.

l. Transfers soiled equipment to the workroom and carries out terminal sterilization or decontamination.

Information Sheet

14. Procedure for a cystoscopy

a. Surgeon assembles cystoscope, fitting the obturator into the sheath, testing the light, and having circulator adjust light current to the proper brightness.

b. Surgeon lubricates the instrument and inserts it into the patient's urethra.

c. Surgeon removes the obturator and inserts telescope into the sheath.

d. Surgeon makes examination by looking into the eyepiece of the telescope. The surgeon will adjust the flow and volume of the irrigating fluid to the bladder for best visualization.

e. Surgeon exchanges or supplements the cystoscope lens with the appropriate accessory instruments if ureteral catheterization, biopsy, stents, or stone or foreign body removal is necessary.

Note: Specimens may be collected or x-ray examinations or kidney function studies may be done. Although a cystoscopy is defined as just the visual inspection, the surgeon may decide to perform another procedure once the cystoscopy has helped diagnose the need. The technologist should be prepared for various procedures.

f. Surgeon removes instrument and may insert a urethral catheter.

15. Characteristics of a resectoscope

a. Used for resections of the bladder and of urethral and prostatic tissue

b. Available in four main types:

(1) Stern-McCarthy

(2) Nesbit

(3) Iglesias

(4) Baumrucker

c. Consists of the following components:

(1) Telescope

(2) Cutting electrode ("loop")

(3) Working element

(4) Sheath

(5) Obturator

Information Sheet

d. Utilizes electric current generated by the electrosurgical unit to remove tissue piece by piece

e. As urologist excises bits of tissue with the cutting electrode, the tissue collects within the bladder along with the irrigation fluid.

f. To remove the tissue as specimens, the fluid is emptied into an evacuator such as the Ellik, and then the evacuator is emptied over the wire mesh plate.

16. **Operations on the penis and urethra and their definitions**

a. **Hypospadias repair** — Correction of the congenital anomaly known as hypospadias

b. **Epispadias repair** — Correction of the congenital anomaly known as epispadias

c. **Circumcision** — Excision of the foreskin (prepuce) of the glans penis

Note: This may be performed on male infants at birth prophylactically or for religious reasons, but it may also be done on adult males who have phimosis or paraphimosis.

d. **Urethral meatotomy** — Incisional enlargement of the external urethral meatus to relieve stenosis or stricture

e. **Urethral dilation and internal urethrotomy** — Gradual dilation and removal of a urethral stricture to provide adequate urinary drainage

f. **Urethroplasty** — Repair of a urethral stricture that fails to respond to intermittent dilation

g. **Penile implant** — Insertion of a penile prosthesis for treatment of sexual impotence

Note: Although this will allow the patient to engage in sexual intercourse, it does not alleviate the cause of the impotence, whether it is physical or psychological.

17. **Operations on the scrotum and their definitions**

a. **Hydrocelectomy** — Excision of the tunica vaginalis of the testis to remove the fluid-filled sac (hydrocele)

b. **Vasectomy** — Excision of a section of the vas deferens as a permanent method of sterilization or prior to a prostatectomy to prevent the spread of infection from the urethra to the epididymis

Note: Permission must be obtained according to state laws and hospital policy.

Information Sheet

c. **Vasovasostomy** — Microsurgical restoration of the continuity of the divided vas deferens

d. **Epididymectomy** — Excision of the epididymis from the testis

e. **Spermatocelectomy** — Removal of the spermatocele which is usually attached to the upper pole of the epididymis within the scrotum

f. **Varicocelectomy** — Ligation and partial excision of dilated veins in the scrotum

g. **Orchiopexy** — Surgical transfer and suturing of an undescended testis into the scrotum

Note: This is usually performed on boys with undescended testis at preschool age or for testicular torsion.

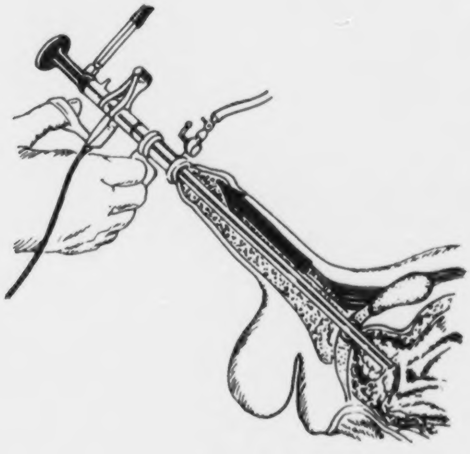
h. **Orchiectomy** — Removal of a testis (or testes)

i. **Radical lymphadenectomy** — Bilateral resection of retroperitoneal lymph nodes for treatment of testicular tumors; usually performed after an orchiectomy

18. **Types of prostatectomies and their characteristics**

a. **Transurethral resection of the prostate gland (TURP)**

Figure 14



(1) Piecemeal resection of the prostate gland by means of a resectoscope passed through the urethra

(2) Most common approach

(3) Requires no incision, and thus has a shorter convalescence period than other approaches

Information Sheet

(4) Used for moderately enlarged, benign, hypertrophied glands

(5) Useful for patients who are poor surgical risks

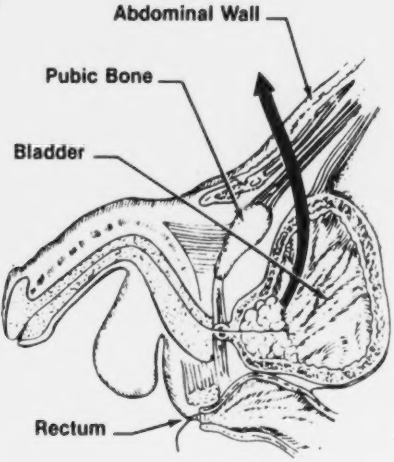
(6) Cannot be used for greatly enlarged glands or for total prostatectomy

(7) This is not an enucleation of the prostate gland. Therefore, obstruction may recur after this surgery, requiring repeat procedures.

(8) Patient is placed in the lithotomy position.

b. Suprapubic prostatectomy

Figure 15



(1) Enucleation of the prostate gland through an abdominal incision and through the bladder

(2) Offers a wide area of exploration

(3) Allows more complete removal of the gland .

(4) Permits treatment of associated bladder problems such as calculus or diverticulum

(5) May have difficulty in controlling hemorrhage

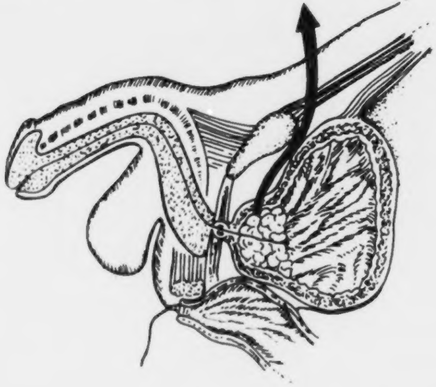
(6) May have postoperative urinary leakage around the suprapubic catheter

(7) Patient is placed in supine or modified Trendelenburg position, with legs apart and the weight of the torso supported by shoulder braces.

Information Sheet

c. Retropubic prostatectomy

Figure 16



(1) Enucleation of the prostatic hypertrophied masses directly through an abdominal incision in the upper surface of the prostate

(2) Incision does not go through bladder.

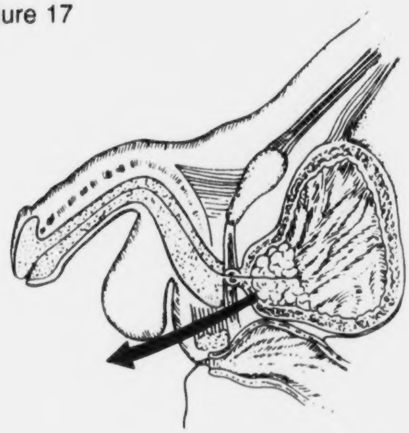
(3) Offers better visualization of the prostate gland and the prostatic urethra

(4) Increased incidence of inflammation of the pubis

(5) Patient is placed in supine or modified Trendelenburg position, with legs apart and the weight of the torso supported by shoulder braces.

d. Perineal prostatectomy

Figure 17



Information Sheet

(1) Enucleation of neoplasms or removal of entire prostate gland through a curved incision made just above the anal margin

(2) Offers a direct and accurate approach to the prostate gland

(3) Allows postoperative dependent drainage

(4) Has a higher incidence of impotence and urinary incontinence postoperatively

(5) Patient is placed in extreme lithotomy position with buttocks elevated on pads to tilt the pelvis and flatten the perineum on the vertical plane.

e. **Radical prostatectomy with retroperitoneal lymphadenectomy**

(1) Enucleation of the prostate gland

(2) Bilateral resection of retroperitoneal lymphatic nodes

(3) Resection of the spermatic vessels on the affected side

(4) Viscera repositioned into the abdominal cavity

19. **Open operations on the bladder**

a. **Cystotomy** — Incision into the bladder

b. **Cystolithotomy** — Incision into the bladder to remove stones

c. **Cystostomy** — Incision into the bladder for continuous drainage

d. **Partial cystectomy** — Resection of a portion of the bladder with the lesion

e. **Total cystectomy** — Removal of the bladder and adjacent structures with subsequent urinary diversion

f. **Bladder neck operation (Y-V-plasty)** — Plastic repair of the bladder neck to overcome contracture of the bladder neck caused by primary or secondary stricture

Information Sheet

20. **Operations on the kidney and ureter and their descriptions**

    a. **Cutaneous ureterostomy** — Permanent diversion of the flow of urine from the kidney, via the ureter, away from the bladder and onto the skin, usually on the abdomen

    b. **Extracorporal shock wave lithotripsy (ESWL)** — Noninvasive fragmentation of kidney stones with shock waves

    c. **Foley-Y pyeloureteroplasty** — Combined correction of a redundant renal pelvis with resection of a stenotic area of the ureter

    d. **Heminephrectomy** — Partial excision of the kidney

    e. **Litholapaxy** (lithotripsy) — Closed procedure in which bladder calculi are crushed and removed through the urethra

    f. **Nephrectomy** — Removal of a kidney to treat some congenital abnormalities, tumors, diseases, or injuries to the kidney; also performed prior to a transplant

    g. **Nephrolithotomy** — Removal of a large intact stone or exploration of a calyx where a small stone or fragment has slipped

    h. **Nephroscopy** — Direct visualization of the interior of the kidney by means of a nephroscope

    i. **Nephrostomy** — Incision into the kidney for temporary or permanent drainage

    j. **Nephrotomy** — Incision into the kidney

    k. **Nephroureterectomy** — Removal of a kidney and the entire ureter that drains it

    l. **Pyelolithotomy** — Removal of a stone or stones through the opening made in the renal pelvis

    m. **Pyeloplasty** — Reconstruction of the renal pelvis

    n. **Pyelostomy** — Incision into the renal pelvis for temporary or permanent diversion of urine

    o. **Pyelotomy** — Incision into the renal pelvis

    p. **Radical nephrectomy** — Excision of kidney, perirenal fat, adrenal gland, Gerota's capsule, and involved periaortic lymph nodes

Information Sheet

q. **Ureterectomy** — Complete removal of the ureter

Note: This procedure will include a nephrectomy and the excision of a cuff of the bladder.

r. **Ureteroileostomy** (ileal conduit) — Diversion of the ureter into a segment of the ileum

s. **Ureterolithotomy** — Incision into the ureter and removal of a stone

t. **Ureteroneocystostomy** — Division of the ureter from the bladder and reimplantation of the ureter into the bladder at another site to treat urinary reflux or performed in conjunction with a partial cystectomy

u. **Ureteroplasty** — Reconstruction of the ureter (usually at the ureteropelvic junction)

v. **Ureterosigmoidostomy** — Diversion of the ureter into a segment of the sigmoid colon

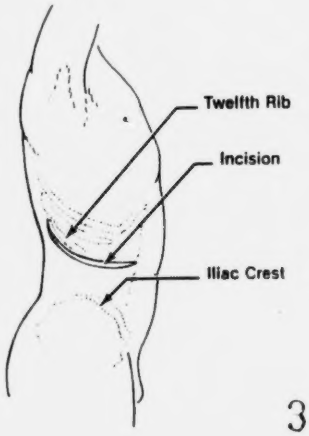
w. **Ureterostomy** — Opening the ureter for continued drainage from it into another part

x. **Ureteroureterostomy** — Division of the ureter and reconstruction in continuity with another ureteral segment

21. **Incisional approaches to the kidney**

a. **Lumbar or simple flank incision** — With patient in lateral position, surgeon begins incision at the costovertebral angle, and running parallel to the twelfth rib, extends it forward and downward between the iliac crest and the thorax

Figure 18



Information Sheet

b. **Nagamatsu incision** — Modification of the simple flank incision (with patient in lateral position) made over the eleventh and twelfth ribs, removing a section of each

c. **Thoracoabdominal incision** — With patient in lateral position, the tenth and eleventh ribs are removed, and the chest cavity is opened, collapsing the lung; rib spreaders, approximators, and chest drainage are required

22. Characteristics of an adrenalectomy

a. Partial or total excision of one or both adrenal glands

b. Performed for one of the following reasons:

(1) To treat hyperfunction of the adrenals

(2) To remove tumors of the adrenals

(3) To treat tumors elsewhere in the body that are affected by adrenal hormonal secretions, such as carcinoma of the prostate or breast

c. Patient may be placed in lateral position for flank approach and excision of one gland or in supine position for thoracoabdominal approach and excision of both glands

23. Kidney transplanting

a. Involves the transplantation of a living related or cadaveric donor kidney into the recipient's iliac fossa

b. Performed to restore renal function and thus maintain life in a patient who has end-stage renal disease

c. A complete workup detailing blood type, tissue type, and lymphocyte cross match is done to determine donor-recipient compatibility.

d. The ideal living donor is an identical twin, although a close family member such as a sibling or parent may be a donor, if medically acceptable.

e. The ideal cadaver donor is young, free of infection and cancer, normotensive until a short time before death, and under hospital observation several hours prior to death.

Note: Permission to "harvest the kidney" from a cadaver must be obtained according to state legislative requirements.

f. Each potential recipient is judged on individual merits, regardless of age.

g. Transplantation from a living donor requires two adjacent operating rooms with operations on the donor and recipient occurring simultaneously.

h. Patients are given immune suppressants to prevent rejection.

i. Even after the kidney transplantation, the patient may require postoperative dialysis for a period of time.

24. Procedure for a circumcision

a. Patient is placed in the supine position.

Note: Infants may be placed on a specially constructed board which immobilizes the limbs and exposes the genitals.

b. Surgeon places several straight hemostats (Kelly or Crile) on the edge of the prepuce.

c. Using fine dissecting scissors, surgeon makes a longitudinal incision through the prepuce, and then makes a circular incision through the prepuce in a similar fashion.

d. Surgeon passes the excised prepuce to technologist as a specimen.

e. Surgeon controls small bleeders with the electrosurgical pencil.

f. Surgeon approximates the skin edges with interrupted fine absorbable sutures swaged to a fine cutting needle.

Note: The skin is commonly not sutured in the newborn.

g. Surgeon dresses wound with petrolatum gauze.

25. Procedure for an orchiectomy

a. Patient is placed in the supine position, prepped, and draped for a scrotal incision.

b. Surgeon incises the scrotum over the testicle and delivers it from the wound.

c. Surgeon cauterizes or clamps and ligates small bleeders.

d. Surgeon places two Mayo clamps across the vas deferens and vessels.

e. Surgeon ligates the tissue with the knife or dissecting scissors to free the testicle.

Information Sheet

f. Surgeon passes the testicle to the technologist as a specimen.

g. Surgeon ligates vas and its vessels with heavy absorbable sutures.

Note: Surgeon may place a testicular prosthesis in the scrotum. These are available in various sizes.

h. Surgeon may place a Penrose drain in the scrotum, and then closes the wound in layers with small absorbable sutures swaged to a fine cutting needle.

i. Surgeon dresses wound with gauze dressing and a scrotal support.

26. Procedure for a transurethral resection of the prostrate gland (TURP)

Note: Spinal anesthesia is commonly performed for transurethral resections.

a. Surgeon inspects resectoscope and associated equipment to make sure all are in working condition, and then dilates the urethra with sounds such as Van Buren.

Note: Surgeon will now perform, if it was not performed several days before surgery, a cystourethroscopy to assess the degree of prostatic obstruction and to inspect the bladder.

b. Surgeon inserts a well-lubricated sheath with its obturator into the urethra.

Note: The lubrication must be nonconductive because of the use of the electrosurgical unit.

c. Irrigation tubing, light cord, and electrosurgical cord are connected.

d. Surgeon removes obturator, assembles the working element with the telescope and cutting loop, and inserts it through the sheath.

e. Nonelectrolytic irrigation fluid such as 1.5% glycine fills the bladder.

f. Surgeon inspects the prostatic urethra and bladder trigone.

g. Surgeon beings electrodissection by alternately using the cutting and coagulating or blend currents.

h. Surgeon drains the bladder at several intervals to wash out prostatic tissue and small blood clots.

Note: At times the surgeon may need to manually irrigate; therefore, a basin of glycine solution, and Ellik evacuator, and a Toomey syringe should be available.

Information Sheet

- i. When resection is completed, surgeon will inspect prostatic fossa for bleeding points.
- j. Surgeon removes resectoscope and inserts a Foley catheter (2- or 3-way, 30 cc balloon) into the bladder for urinary drainage and hemostasis.
- k. Before the patient is transferred to recovery, the glycine irrigation must be discontinued and isotonic saline solution used in its place.

27. Procedure for a nephrectomy

- a. Patient is placed in the lateral position with affected side up, prepped, and draped.
- b. Surgeon makes curved incision across the flank, and divides fascia and muscle tissue with dissecting scissors and cautery.

  Note: Occasionally a rib must be sacrificed in order to gain access to the retroperitoneal space in which the kidney lies. If a rib is to be taken, the technologist should have periosteal elevators and rib shears available. Divided rib will be passed to technologist as a specimen.
- c. Surgeon places a self-retaining retractor in the wound.
- d. To mobilize the kidney, surgeon incises Gerota's capsule and extends the incision with Metzenbaum scissors.
- e. Surgeon uses blunt dissection to separate the kidney from the capsule and surrounding fatty tissue.
- f. Surgeon identifies and frees the ureter from its attachments by sharp dissection. Assistant uses narrow Penrose drain, umbilical tape, or vessel loops to retract the ureter.
- g. Surgeon dissects and ligates the renal artery and the vein using right-angle clamps. The vessels may be clamped individually or together.
- h. Surgeon places two clamps across the ureter, divides it, and ligates the distal end with an absorbable suture ligature (size 0 or 2-0) swaged to a taper needle.
- i. Surgeon passes kidney to technologist as a specimen.
- j. Surgeon closes layers using sutures of choice and dresses the wound.

Information Sheet

28. Procedure for a ureterolithotomy

Note: Surgeon may choose one of several incisions to gain access to the ureter depending upon the location of the stone. These include a lower midline, inguinal, or flank. This will affect the positioning of the patient.

a. Surgeon makes selected incision to enter the retroperitoneal space.

b. Surgeon locates stone by manual examination.

c. Surgeon uses Metzenbaum scissors to dissect the ureter free.

d. Surgeon places a small Penrose drain, vessel loops, or umbilical tape around the ureter above the area of the stone to prevent its migration in the renal pelvis.

e. Surgeon places a Babcock clamp or stone forcep across the ureter below the stone to prevent it from moving downward.

f. Surgeon makes a small incision over the stone using a small knife blade, and removes the stone with fine tissue forceps or stone grasping forceps.

Note: The surgeon may use a variety of forceps for kidney procedures, depending on the location of the stone, including Randall, Leukowitz, Mayo radical, or Satinsky radical forceps.

g. Surgeon passes stone to technologist as a specimen.

h. Surgeon may close ureteral incision with interrupted absorbable sutures, or may choose to allow it to close spontaneously.

i. Surgeon closes layers using sutures of choice and dresses the wound.

Genitourinary Surgery
Unit 6

Student Supplement 1—Review Anatomy of the Kidney

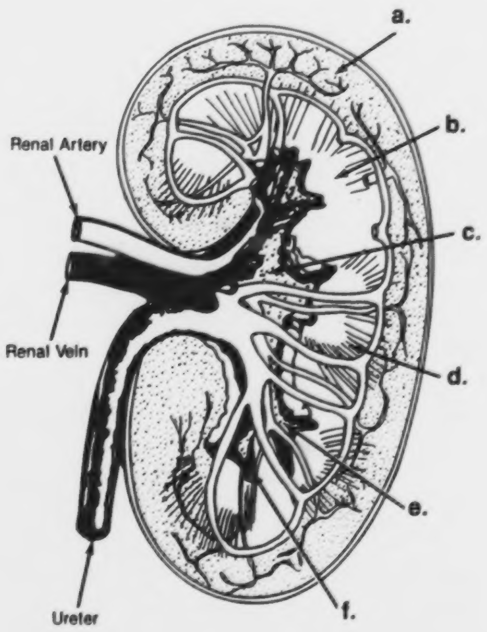
Name ______________________ Date ______________

Directions: Identify the following structures of the kidney, and place your answers in the blanks provided.

a. ______________________ d. ______________________

b. ______________________ e. ______________________

c. ______________________ f. ______________________


a.
b.
Renal Artery
c.
Renal Vein
d.
e.
Ureter
f.

Vertical Section Through a Kidney

Genitourinary Surgery
Unit 6

Student Supplement 2—Review Anatomy of the Male Genitourinary System

Name ______________________________ Date ____________________

Directions: Identify the following structures of the male genitourinary system, and place your answers in the blanks provided.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

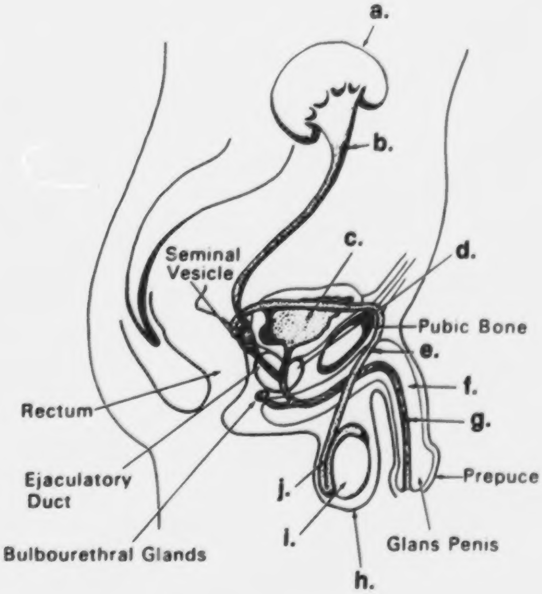
f. ____________________

g. ____________________

h. ____________________

i. ____________________

j. ____________________


a.
b.
c.
Seminal Vesicle
d.
Pubic Bone
e.
f.
Rectum
g.
Prepuce
Ejaculatory Duct
j.
i.
Glans Penis
Bulbourethral Glands
h.

Male Genitourinary System

Genitourinary Surgery
Unit 6

Student Supplement 3—Review Anatomy of the Female Genitourinary System

Name ______________________________ Date ____________________

Directions: Identify the following structures of the female genitourinary system, and place your answers in the blanks provided.

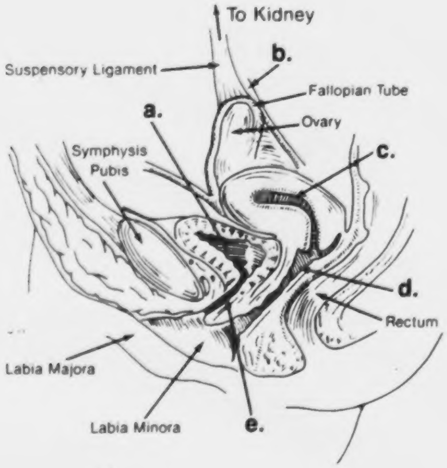
a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________


To Kidney
b.
Suspensory Ligament
Fallopian Tube
a.
Ovary
c.
Symphysis Pubis
d.
Rectum
Labia Majora
Labia Minora
e.

Female Genitourinary System

Genitourinary Surgery
Unit 6

Student Supplement 4—Review Concepts of Genitourinary Surgery

Name ______________________________ Date ____________________

Directions: Select the best answers for the following questions or incomplete statements concerning genitourinary surgery. Place your answers in the blanks provided.

______ 1. What surgical procedure is done to correct the abnormality in which the urethral meatus is situated on the dorsum of the penis?

a. Urethral meatotomy
b. Epispadias repair
c. Hypospadias repair
d. Urethroplasty

______ 2. What is nonmalignant enlargement of the prostate?

a. Prostatitis
b. BPH
c. TURP
d. Prostatism

______ 3. A double bowl-shaped glass evacuator used to irrigate the bladder during transurethral surgery is called a/an

a. Robb
b. Valentine
c. Ellik
d. Toomey

______ 4. When the prostate gland is removed through an abdominal incision into the prostate capsule, it is called a __________ prostatectomy.

a. Perineal
b. Suprapubic
c. Retropubic
d. Transurethral

______ 5. Crushing a urinary calculus in the bladder through the urethra is called

a. Cystolithotomy
b. Litholapaxy
c. Urethrotomy
d. Urethroplasty

Student Supplement 4

______ 6. Microscopic reversal of the male sterilization procedure is termed

a. Spermatogenesis
b. Orchiopexy
c. Vasovasostomy
d. Vasectomy

______ 7. All of the following are components of a resectoscope EXCEPT

a. Sheath
b. Obturator
c. Lithotrite
d. Working element

______ 8. Carcinoma of the prostate or breast frequently requires removal of the adrenal glands to diminish ____________ secretion.

a. Adrenaline
b. Enzyme
c. Fluid
d. Hormone

______ 9. Abdominal surgery for removal of stones from a kidney is called

a. Pyelolithotomy
b. Nephrolithotomy
c. Litholapaxy
d. Pyelotomy

______10. When the foreskin of the penis cannot be retracted over the glans, it is called

a. Phimosis
b. Hypospadias
c. Chordee
d. Balanitis

______11. Abdominal resection of the prostate gland through an incision into the bladder is known surgically as a

a. Retropubic prostatectomy
b. Suprapubic prostatectomy
c. Transurethral resection
d. Suprapubic cystostomy

Student Supplement 4

______12. The irrigating solution most commonly used during transurethral surgery is

a. Saline
b. Water
c. Glycine
d. Physiosol

______13. The process of removing waste products from the blood of a patient in renal failure is called

a. Filtration
b. Revascularization
c. Perfusion
d. Dialysis

______14. To "harvest a kidney" is a phrase denoting a ____________ kidney.

a. Pyogenic
b. Cadaver's
c. Nonfunctioning
d. Dropped

______15. Which surgical procedure is most likely indicated for removal of a benign, grossly hypertrophied prostate?

a. Retropubic prostatectomy
b. Suprapubic prostatectomy
c. Transurethral prostatectomy
d. Perineal prostatectomy

______16. Continuous irrigation of the bladder is necessary during cystoscopy to

a. Keep the area moistened and thus reduce trauma
b. Act as a viewing medium
c. Reduce heat from the lighted scope
d. Distend the bladder walls for better visualization

______17. All of the following are incisional options in a nephrectomy EXCEPT

a. Simple flank
b. Thoracoabdominal
c. Kocher
d. Nagamatsu

Student Supplement 4

______18. Removal of a testis or the testes is called

a. Orchiopexy
b. Orchiectomy
c. Epididymectomy
d. Vasectomy

______19. An abnormal accumulation of fluid in the tunica vaginalis is referred to as a

a. Hydrocele
b. Spermatocele
c. Cystocele
d. Varicocele

______20. ____________ is a closed procedure.

a. Vasectomy
b. Litholapaxy
c. Retropubic prostatectomy
d. Cystolithotomy

______21. The patient is placed in the extreme lithotomy position for a ____________ prostatectomy.

a. Retropubic
b. Suprapubic
c. Transurethral
d. Perineal

______22. The ideal living donor for a kidney transplant is the patient's

a. Mother
b. Father
c. Identical twin
d. Fraternal twin

______23. A cuplike cavity extending from the renal pelvis is called a

a. Glomerulus
b. Calculus
c. Calyx
d. Depression

Student Supplement 4

______24. A disease of the kidneys in which there is malfunction of the kidney tissue without inflammation is called

a. Pyelonephritis
b. Nephrolithiasis
c. Pyelitis
d. Nephrosis

______25. The hollow tube that provides the passageway for instruments during cystoscopy is

a. Sheath
b. Obturator
c. Telescope
d. Working element

______26. A noninvasive fragmentation of kidney stones with shock waves is called

a. Ureterolithotomy
b. Cystolithotripsy
c. Extracorporal lithotripsy
d. Pericutaneous lithotripsy

______27. All of the following are ureteral catheters EXCEPT

a. Olive tip catheter
b. Whistle tip catheter
c. Cone tip catheter
d. Pezzer catheter

______28. Select the **one** instrument that is **not** used in urological surgery.

a. Herrick clamp
b. Mayo vessel clamp
c. Randall stone forcep
d. Rhoton forcep

Genitourinary Surgery
Unit 6

Assignment Sheet 1—Determine Needs for Selected Urological Surgery Patients and Procedures

Name ______________________ Overall Rating ______________

Evaluation criterion	**Rating**
Answers are appropriate	______

Directions: Read each test item carefully and answer as requested by inserting the correct answers.

Case A: You are assigned to a cystoscopy case. List the components of the cystoscope and state their functions.

Cystoscope Components	Functions
1.	
2.	
3.	
4.	

Case B: You are assigned to scrub for a nephrectomy. Answer the following questions about the procedure by filling in the blanks.

1. The patient is placed in the (a) ______________ position with the (b) ______________ side up.

2. A rib is to be taken. As the scrub technologist you will have ready (a) ______________ elevators and rib (b) ______________.

Assignment Sheet 1

3. The divided rib is passed to the technologist and is identified as the ____________________.

   The wound is retracted by a self-retaining retractor.

4. The kidney is mobilized by incision of (a) ____________________ capsule, and (b) ____________________ dissection is used to separate the kidney from the capsule and the fatty tissue.

5. The ____________________ is/are identified and freed.

6. Ligation and dissection of the (a) ____________________ artery and vein are carried out. (b)____________________ suture ligature (size 0 or 2-0) or a swaged (c) ____________________ needle is used.

   The kidney is passed to the technologist as a specimen, and the surgeon closes with suture of choice.

Case C: A 30-year-old adult male is diagnosed with phimosis. What procedure would his surgeon schedule to correct this condition? ____

For this procedure, select the correct instruments from the list below, and draw a functional Mayo on the next page. Include the names on your drawing.

Instrument Selection Items:

Russian tissue forceps
Adson tissue forceps
Kelly or Crile forceps
Knife blade
Mayo scissors
Right angle forceps
Heaney needleholder
Allis forceps holder
Heaney curettes
Electrosurgical pencil

Bakes dilator(s)
Probe
Army-Navy retractor(s)
Parker retractor(s)
Fine dissecting scissors
Knife handle
Kocher forceps
Webster needleholder
Hank dilator(s)
Toothed tissue forceps

Assignment Sheet 1

MAYO

Genitourinary Surgery
Unit 6

Job Sheet 1—Insert a Straight Catheter in a Female Patient

Name ______________________ Attempt Number ________

Date ______________________ Overall Rating ________

Evaluation criteria	**Rating**
Assembled necessary supplies	______
Followed directions	______
Performed each step in appropriate sequence	______
Followed aseptic technique when appropriate	______
Used proper communication skills	______
Provided for patient comfort and privacy	______

Instructions: When you are ready to perform this task, ask your instructor to observe the procedure and rate your performance using the evaluation criteria.

A. Equipment and supplies

1. Nonsterile

    a. Bed protector
    b. Bath blanket or drape
    c. Washcloth and towel
    d. Soap and water
    e. Proper lighting

2. Sterile catheterization set which usually includes the following:

    a. Drapes
    b. Receptacle for urine
    c. Catheter, size 16 Fr.
    d. Cotton balls
    e. Forceps
    f. Lubricant
    g. Gloves
    h. Antiseptic solution

    Note: Ask patient if she has sensitivity to solution; if so, obtain another type.

Job Sheet 1

B. Procedure

- ☐ 1. Check physician's order.
- ☐ 2. Check time the patient last voided.
- ☐ 3. Wash hands.
- ☐ 4. Assemble correct equipment.
- ☐ 5. Identify patient, and assuming patient is awake, explain procedure.
- ☐ 6. Prepare patient for the procedure.
    - a. Provide for privacy.
    - b. Replace top covers with bath blanket or drape.
    - c. Place patient in modified supine position with knees bent and flexed.

      Note: If the patient is not awake, you will need someone to hold the patient's legs, or use the frog leg position if you are performing this job sheet alone.
    - d. Place bed protector under patient's hips.
    - e. Drape to expose perineal area.
    - f. Adjust light.
- ☐ 7. Place catheter tray between patient's legs, six inches from perineum.

Job Sheet 1

☐ 8. Open wrapper of tray, using sterile technique. Do not touch inside of tray.

Figure 1

☐ 9. Don sterile gloves.

☐ 10. Lift sterile drape off tray so that drape does not touch any contaminated areas.

☐ 11. Unfold drape by placing hands on inside of drape with thumbs on outside. Roll thumbs in as hands are turned in, so that drape will cover your sterile gloves.

Figure 2

Job Sheet 1

☐ 12. Instruct patient to raise buttocks off bed as you slide drape under patient.

Note: For this step and the next, you will need assistance if the patient is not awake.

☐ 13. Instruct patient to lower buttocks slowly as you remove your gloved hands.

☐ 14. Lift out sterile tray and place it on sterile drape.

Figure 3

☐ 15. Open packet of sterile antiseptic solution and pour over part of cotton balls in tray.

☐ 16. Open packet of lubricant.

☐ 17. Remove sterile catheter from tray, being careful not to let any part of catheter touch any contaminated areas.

☐ 18. Apply lubricant to tip of catheter. Place in sterile tray, ready for insertion.

Job Sheet 1

☐ 19. Apply top drape so that perineum is uncovered by slit in drape.

Figure 4

☐ 20. Separate labia with thumb and forefinger of one hand to expose the urinary meatus.

Note: This separation of the labia must be maintained until catheter is in place.

☐ 21. Cleanse meatus by wiping anterior to posterior on far side of the meatus with cotton ball and antiseptic solution. Discard cotton ball.

☐ 22. Cleanse near side of meatus with second cotton ball and antiseptic solution. Discard cotton ball.

☐ 23. Cleanse center of vestibule area with third cotton ball and antiseptic solution. Discard cotton ball.

Note: A dry cotton ball may be used to remove excess solution.

☐ 24. Pick up catheter and hold close to lubricated end with other hand.

☐ 25. Insert catheter into meatus, using a gentle motion, about 1 to 1½ inches until you see urine returning into the tubing.

☐ 26. Hold catheter in place by using the fingers that separated the labias.

Note: Withdraw catheter about one-half inch when flow stops, to be sure bladder is empty.

Job Sheet 1

☐ 27. Collect specimen if needed at this time.

☐ 28. Pinch off catheter with one hand. Withdraw smoothly with the other hand.

☐ 29. Cleanse and dry perineum.

☐ 30. Remove gloves, drapes, and equipment. Dispose of properly.

☐ 31. Make patient comfortable.

☐ 32. Remove urine specimen and record the number of cubic centimeters collected. Note color and any sediment. Prepare to send to laboratory for study if needed; if not, discard in toilet.

☐ 33. Wash hands.

☐ 34. Report and record treatment including:

  a. Time

  b. Procedure performed and purpose

  c. Amount and appearance of urine

  d. Patient's tolerance of procedure

Evaluator's comments: ______________________________

____

____

Genitourinary Surgery
Unit 6

Job Sheet 2—Insert a Straight Catheter in a Male Patient

Name ______________________ Attempt Number ________

Date ______________________ Overall Rating ________

Evaluation criteria	**Rating**
Assembled necessary supplies	______
Followed directions	______
Performed each step in appropriate sequence	______
Followed aseptic technique when appropriate	______
Used proper communication skills	______
Provided for patient comfort and privacy	______

Instructions: When you are ready to perform this task, ask your instructor to observe the procedure and rate your performance using the evaluation criteria.

A. Equipment and supplies

1. Nonsterile
    - a. Bed protector
    - b. Bath blanket or drape
    - c. Washcloth and towel
    - d. Soap and water
    - e. Proper lighting
2. Sterile catheterization set which usually includes the following:
    - a. Drapes
    - b. Receptacle for urine
    - c. Catheter, size 16 Fr.
    - d. Cotton balls
    - e. Forceps
    - f. Lubricant
    - g. Specimen bottle with cap and label
    - h. Gloves
    - i. Antiseptic solution

    Note: Ask patient if he has sensitivity to solution; if so, obtain another type.

Job Sheet 2

B. Procedure

☐ 1. Check physician's order.

☐ 2. Check time patient last voided.

☐ 3. Wash hands.

☐ 4. Assemble correct equipment.

☐ 5. Identify patient, and explain procedure.

☐ 6. Prepare patient for the procedure.

   a. Provide privacy.

   b. Replace top covers with bath blanket or drape.

   c. Place patient in supine position.

   d. Wash external genitalia with soap and water. Rinse well and dry.

   e. Place bed protector under patient's hips.

   f. Drape patient to expose the penis.

   Note: This can be done by using a special drape prepared for this purpose or by pushing the bath blanket in from one side to expose the penis.

   g. Adjust light.

☐ 7. Place equipment in convenient place.

☐ 8. Open set and proceed according to manufacturer's instructions.

☐ 9. Prepare for catheterization.

   a. Place the sterile drape around the penile area.

   b. Hold the penis with one hand. Pull back the foreskin on the penis and hold it back.

   c. Avoid touching the patient with the other hand as you complete the following steps.

Job Sheet 2

d. Use a cotton ball saturated with antiseptic solution to clean the glans penis. Using a circular motion, start at the tip and gradually work back.

e. Discard cotton ball and repeat the procedure twice.

Note: A dry cotton ball may be used to remove excess solution.

f. Discard cotton ball.

g. Continue holding the penis with one hand.

☐ 10. Pick up the catheter approximately 4" inches from the tip.

☐ 11. Lubricate the tip of the catheter.

☐ 12. Hold the penis straight with one hand while inserting the catheter with the other hand.

Figure 1

☐ 13. Insert the catheter, using gentle but steady pressure.

Note: A slight resistance may be felt as the prostate gland and the bladder sphincter muscle are reached. Lower the penis and use gentle pressure to push the catheter past. If you cannot insert the catheter with gentle pressure, stop and ask for assistance.

☐ 14. Insert the catheter, usually about 7-8", until urine begins to flow.

☐ 15. Allow the urine to flow into the collecting basin.

Note: Save sterile urine specimen if one is ordered.

☐ 16. Remove the catheter with one gentle pull when the urine ceases to flow.

Job Sheet 2

☐ 17. Pull the foreskin back over the tip of the penis if patient has not been circumcised.

Note: If the foreskin remains behind the tip of the penis, it will cut off the blood supply and the penis will swell. If this swelling is not observed and relieved, gangrene of the penis may occur.

☐ 18. Complete care of patient.

  a. Remove bed protector and bath blanket.

  b. Replace top covers.

  c. Provide for patient's comfort.

☐ 19. Remove and care for equipment as required. Discard disposable equipment.

☐ 20. Wash hands.

☐ 21. Report and record procedure, including the following:

  a. Time

  b. Procedure performed

  c. Amount and appearance of urine

Evaluator's comments: ____

____

____

Genitourinary Surgery
Unit 6

Job Sheet 3—Insert a Foley Catheter in a Female Patient

Name ______________________________ Attempt Number ________

Date ______________________________ Overall Rating ________

Evaluation criteria	**Rating**
Assembled necessary supplies	______
Followed directions	______
Performed each step in appropriate sequence	______
Followed aseptic technique when appropriate	______
Used proper communication skills	______
Provided for patient comfort and privacy	______

Instructions: When you are ready to perform this task, ask your instructor to observe the procedure and rate your performance using the evaluation criteria.

A. Equipment and supplies

1. Prep tray
2. Prep solution
3. Sterile forcep or clamp
4. Foley catheter (size by physician's preference)
5. Drainage tubing and bag
6. Collecting basin
7. Tape

B. Procedure

☐ 1. Wash hands before patient enters OR.

☐ 2. Assemble correct equipment.

☐ 3. Open prep tray and pour prep solution.

☐ 4. Uncoil drainage tubing, close exit outlets on drainage bag, hang drainage bag on OR table, and place connecting tubing in a convenient place close to the insertion site so the tubing will be readily available when you have inserted the catheter and are ready to connect it to the tubing.

Note: Some hospitals use catheter trays in which the drainage bag and catheter are already connected.

Job Sheet 3

☐ 5. Place patient in a modified supine position with knees bent and legs flexed.

☐ 6. Adjust light.

☐ 7. Don sterile gloves.

☐ 8. Place sterile towel on OR table at the patient's buttocks.

☐ 9. Pull back the cover from the sterile catheter and syringe.

☐ 10. Test catheter to be sure balloon inflates properly by inserting 7-8 ml of sterile water for a 5 cc balloon or 33 ml for a 30 cc balloon.

☐ 11. Prep patient using one hand to expose the meatus and the other hand to perform the prep using sterile forceps and 4 × 4 sponges dipped in prep solution.

Note: Be careful not to contaminate the one hand holding the forceps. This hand will insert the catheter and must remain sterile.

☐ 12. Dip end of catheter into sterile water to ease its insertion.

☐ 13. Grasp catheter 2″ from tip leaving drainage end in a collecting basin.

☐ 14. Insert catheter gently into meatus approximately 2″ until urine flows.

☐ 15. Using the syringe, inject 7-8 ml of sterile water into the 5 cc balloon, or 33 ml of sterile water for the 30 cc balloon.

☐ 16. Pull gently on the catheter to test for retention.

☐ 17. Attach catheter's exit portion to drainage tubing.

☐ 18. Secure catheter to patient's leg with tape, making sure there is no tension on the urethral orifice.

☐ 19. Place collection bag below bladder level.

☐ 20. Remove towels and gloves.

Evaluator's comments: ____

____

____

Ear, Nose, and Throat Surgery
Unit 7

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match common procedures on the ear, nose, and throat with the correct descriptions and complete statements concerning special features of these procedures. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Describe the basic purposes of ear, nose, and throat surgeries.
2. Match terms related to the ear with the correct definitions.
3. Match common otologic procedures with the correct descriptions.
4. Complete statements concerning special features of otologic procedures.
5. Match specialized instruments for otological procedures with the correct uses.
6. Select true statements concerning the procedure for a myringotomy with insertion of PE tubes.
7. Match terms related to the nose with the correct definitions.
8. Match common nasal operative procedures with the correct descriptions.
9. Select true statements concerning special features of nasal procedures.
10. Match specialized instruments for nasal procedures with the correct uses.
11. Arrange in order the procedure for a septoplasty.
12. Select true statements concerning endoscopic sinus procedures.
13. Match terms related to the oral cavity and throat with the correct definitions.
14. Match common operative procedures on the oral cavity and throat with the correct descriptions.

Objective Sheet

15. Complete statements concerning special features of operative procedures on the oral cavity and throat.

16. Match specialized instruments for throat procedures with the correct uses.

17. Select true statements concerning the procedure for a tonsillectomy and adenoidectomy.

18. Determine needs for given ear, nose, and throat surgery cases. (Assignment Sheet 1)

Ear, Nose, and Throat Surgery
Unit 7

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—The Ear (Objective 2)
   TM 2—The Nose and Sense of Smell (Objective 7)
   TM 3—Paranasal Sinuses (Objective 7)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Suggested Activities

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Add any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to ear, nose, and throat surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for ENT surgery. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in ENT surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in ENT surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used by this specialty. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in ENT surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course.

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about ENT surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in this surgical specialty area. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

Suggested Activities

9. Divide students into groups, and assign each group a different procedure commonly performed in ENT surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic set ups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

10. Show videos of procedures common to this specialty area. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology.* Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. *Taber's Cyclopedic Medical Dictionary.* Revised and edited by Clayton L. Thomas. 18th ed. Philadelphia: F. A. Davis Co., 1993.

7. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Activities

Suggested Supplemental Resources

1. *Hearing Loss*, 26-minute videotape. Discusses hearing loss, tinnitus, and Meniere's disease and the ways mechanical aids, medications, and surgery can correct some problems.

2. *To Hear Again*, 19-minute videotape. Describes major risk factors to hearing impairment, two infant hearing tests, and new technologies to aid the hearing impaired including cochlear implants, hearing aids, and digital speech processing.

3. *Ear Appliances and Surgery*, 19-minute videotape. Explains various kinds of hearing loss and the progression of hearing aid technology to correct these problems. Covers microchip devices, digital speech processing, and cochlear implants.

   1 - 3 are available from:

   Films for the Humanities & Sciences
   P.O. Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

4. *Nd:YAG Laser Scalpel Applications in the Ear, Nose, and Throat and Head and Neck Surgery: Preliminary Report*, ACS-1561, 20-minute videotape, 1989.

5. *Journey From Silence*, ACS-1630, 13-minute videotape, 1991. Chronicles a deaf woman's experience with the process of cochlear implantation from inception to completion.

6. *Total Ear Reconstruction with Autogenous Cartilage Grafts*, DG-1457, 41-minute videotape, 1984.

   4 - 6 are available from:

   Cine-Med Inc.
   127 Main Street North
   Woodbury, CT 06798
   800-633-0004 or 203-263-0006

Ear, Nose, and Throat Surgery
Unit 7

Answers to Student Supplements

Student Supplement 1

a. Pinna or auricle
b. External auditory canal
c. Tympanic membrane (eardrum)
d. Stapes
e. Round window
f. Eustachian tube
g. Vestibule
h. Cochlea
i. Semicircular canals
j. Incus

Student Supplement 2

a. Sphenoid sinus
b. Ethmoid sinuses
c. Frontal sinus
d. Maxillary sinus
e. Turbinates or nasal conchea
f. Olfactory bulb

Student Supplement 3

1. b
2. b
3. a
4. a
5. b
6. a
7. d
8. a
9. b
10. b
11. a
12. b
13. c
14. c
15. a
16. a
17. c
18. b
19. a
20. c
21. d
22. c
23. a
24. c
25. d

Ear, Nose, and Throat Surgery
Unit 7

Answers to Assignment Sheet 1

Case A — Myringotomy

1. Anesthesia — General because of patient's age, understanding, and ability to hold still
2. Position — Supine with head turned to the side
3. Aural speculum
4. Either ear curette or ear loop
5. a. Ear knife such as Sexton
   b. Posterior — inferior quadrant
6. a. Alligator (Hartmann) ear forceps
   b. Avoid touching the PE tube with gloves.
7. Instructor should evaluate for completeness and appropriate arrangement. The following instruments should be included:

   a. Aural speculum
   b. Ear knife(s)
   c. Alligator forceps
   d. PE tubes may be included.
   e. Frazier suction may be included. However, it is usually on top of draped patient.
   f. Culture tube may be included, but it may not be used routinely.
   g. Curettes and/or ear loops

   Note: Instructor may change instruments required or specify additional instruments to students.

Case B — Septoplasty

1. Any two of the following:

   a. Cocaine — topical
   b. Xylocaine ® (lidocaine)
   c. Epinephrine

2. Nasal (cottle) septum speculum

Answers to Assignment Sheet 1

3. Skin hooks (small)

4. Freer elevator

5. Nasal forcep

6. Normal saline

7. Any two: Scissors, rasp, or bone crusher

8. Hartmann or nasal dressing forceps

9. Mayo — Should be usable and contain instruments above. Instructor should evaluate for completeness and appropriate arrangement.

Note: Instructor may change instruments required or specify additional instruments to students.

Case C — T & A

1. a. Mouth gag and/or tongue depressor
   b. Adenotome (LaForce) and adenoid curettes (Barnhill)
   c. Tonsil seizing forceps (White) or clamp
   d. Hurd tonsil dissector and dissecting tonsil scissors
   e. Suction

2. Mayo should be usable and contain instruments above, as well as tonsil knife and tonsil sponges. Instructor should evaluate for completeness and appropriate arrangement.

Note: Instructor may change instruments required or specify additional instruments to students.

Ear, Nose, and Throat Surgery
Unit 7

Answers to Written Test

1. Descriptions should include the following:

   a. **Ear** — To improve, preserve, or restore hearing
   b. **Nose** — To restore or improve ventilation, to ensure drainage of sinuses, and to control bleeding
   c. **Throat**— To prevent chronic infection, to remove neoplasms, or to correct other life-threatening disorders

2. a. 12
   b. 3
   c. 18
   d. 14
   e. 1
   f. 8
   g. 13
   h. 16
   i. 2
   j. 5
   k. 11
   l. 17
   m. 9
   n. 15
   o. 10

3. a. 9
   b. 2
   c. 1
   d. 4
   e. 6
   f. 3
   g. 8

4. a. Power drills
   b. Irrigation
   c. Debris
   d. Middle
   e. 1½"
   f. Granuloma
   g. Drying out
   h. Modified supine
   i. Triangular
   j. Microscope
   k. Labeled
   l. Hemostatic

5. a. 9
   b. 3
   c. 6
   d. 5
   e. 2
   f. 1
   g. 4

6. a. F
   b. F
   c. T
   d. F
   e. T
   f. T

Answers to Written Test

7.	a.	6	f.	4
	b.	9	g.	12
	c.	10	h.	8
	d.	11	i.	2
	e.	7		
8.	a.	9	e.	7
	b.	3	f.	1
	c.	6	g.	4
	d.	8	h.	10
9.	a.	T	g.	T
	b.	F	h.	T
	c.	T	i.	F
	d.	F	j.	T
	e.	F	k.	T
	f.	T		
10.	a.	18		
	b.	15 or 19		
	c.	2 or 5		
	d.	6, 9, 11, 12, or 14		
	e.	7, 8, or 13		
	f.	16		
	g.	3, 6, 9, 10, 11, 12, or 14		
	h.	1		
11.	a.	1	f.	5
	b.	2	g.	8
	c.	6	h.	4
	d.	9	i.	7
	e.	3		
12.	a.	T	e.	T
	b.	F	f.	T
	c.	F	g.	F
	d.	T		
13.	a.	4	f.	10
	b.	12	g.	7
	c.	2	h.	5
	d.	6	i.	9
	e.	8	j.	1

Answers to Written Test

14. a. 3 e. 5
b. 6 f. 4
c. 7 g. 8
d. 9 h. 10

15. a. Instrumentation
b. General
c. Sponges
d. Tonsillectomy
e. Labeled
f. Suction or hemostatic aids
g. Draping
h. Drain or nerve stimulator

16. a. 4 or 5
b. 6 or 7
c. 8, 10, 11, or 12
d. 4 or 13
e. 1 or 2

17. a. F f. T
b. F g. F
c. F h. T
d. T i. T
e. T

Ear, Nose, and Throat Surgery
Unit 7

Written Test

Name ______________________ Date ______________ Score _____

1. Describe the basic purposes of ear, nose, and throat surgeries.

   a. Ear surgery — ______________________________

   ____

   b. Nose surgery — ______________________________

   ____

   c. Throat surgery — ______________________________

   ____

2. Match terms related to the ear on the right with the correct definitions.

   ______a. Greek word pertaining to the ear

   ______b. Latin word pertaining to the ear

   ______c. Sensation of moving around in space or of having objects move around you; makes it difficult to maintain equilibrium

   ______d. Condition characterized by chronic progressive deafness caused by formation of spongy bone, especially around the oval window with resulting immobility and fixation of the stapes

   ______e. Latin word pertaining to the sense of hearing

   ______f. Inflammation of the air cells of the mastoid process

   1. Auditory
   2. Auditory acuity
   3. Aural
   4. Cholesteatoma
   5. Conduction
   6. Conductive loss
   7. Decibel
   8. Mastoiditis
   9. Ménière's disease
   10. Ossicle
   11. Otitis media

Written Test

______g. Study of the ear, its functions, and diseases

______h. Hearing loss caused by a defect in the inner ear resulting from damage to nerve tissue and/or sensory paths to the brain

______i. Acuteness or sharpness of hearing

______j. Transmission of sound waves through the conducting media of air or bone

______k. Inflammation of the middle ear

______l. Subjective ringing or tinkling sound in the ear

______m. Disorder of the membranous labyrinth of the inner ear with symptoms including progressive deafness, tinnitus, dizziness, and sensation of fullness or pressure in the ears

______n. Small, drainage tubes placed in the tympanic membrane to prevent the accumulation of fluid in the middle ear

______o. Any small bone, especially one of the three small bones of the ear

12. Oto
13. Otology
14. Otosclerosis
15. Pressure equalization tubes
16. Sensorineural loss
17. Tinnitus
18. Vertigo

Written Test

3. Match common otologic procedures on the right with the correct descriptions.

______a. Any procedure (five types) performed to repair defects in the tympanic membrane and/or middle ear structures

______b. Reconstruction of the outer and middle parts of the ear by means of a new drum of skin flap or creation of a new window into the internal ear mechanism; performed on patients who have a hearing loss resulting from otosclerosis

______c. Placement of a miniature external sound processing disc which bypasses external and middle ear to stimulate the cochlea

______d. Incision of the tympanic membrane under direct vision to treat acute otitis media or to release fluid in the middle ear; PE tubes are frequently inserted through the tympanic membrane in connection with this procedure

______e. Removal of the air cells of the mastoid process, without involving the middle ear or external canal

______f. Removal of the mastoid air cells and the posterior wall of the external ear canal to provide drainage from the mastoid to the canal; preserves the tympanic membrane and the middle ear ossicles

______g. Creation of an opening into the vestibule of the labyrinth and reestablishment of a functioning linkage between the incus and the inner ear; performed on patients who have a hearing loss resulting from fixation of the stapes

1. Bone conduction implantation
2. Fenestration procedure
3. Modified radical mastoidectomy
4. Myringotomy
5. Radical mastoidectomy
6. Simple mastoidectomy
7. Stapedectomy
8. Stapes mobilization
9. Tympanoplasty

Written Test

4. Complete the following statements concerning special features of otologic procedures by correctly filling in the blanks.

   a. ____________________ and their accompanying small burs are commonly used in otologic procedures to remove bone.

   b. Continuous ____________________ is required while drilling to prevent clogging of the bur and to remove bone dust in areas where osteogenesis is to be avoided.

   c. A special suction-irrigation tip is commonly used during otologic surgery which allows the surgeon to irrigate and suction the wound of fluid and ____________________ at the same time.

   d. The operating microscope is used extensively in surgeries on the ____________________ and inner ear since the structures are so small and delicate.

   e. For most major procedures, the hair is removed and then skin is shaved at least ____________________ from the site of the proposed incision.

   f. Gloves must be powder-free since ____________________ formation in the ear can cause irreversible hearing loss.

   g. Tissue grafts must be kept from ____________________ prior to use.

   h. The patient is commonly placed in a ____________________ position with the head turned to the side and the affected ear uppermost. The head must be immobilized and supported with a pad or a brace.

   i. In the draping procedure, three, folded lengthwise towels or plastic drapes are placed around the operative site creating a ____________________-shaped operative field around the affected ear.

   j. The surgeon adjusts the ____________________ before it is draped, so that only fine manipulation is required during surgery.

   k. Because many colorless solutions may be on the table, they must be accurately and clearly ____________________.

   l. ____________________ aids such as absorbable gelatin sponges must be ready at all times.

Written Test

5. Match the specialized instruments for otological procedures on the right with the correct uses.

______a. Used for postauricular incisions to expose the mastoid area

______b. Used to grasp tissue or foreign objects in the ear canal, to pack ear canal postoperatively, or to grasp tissue in mastoidectomy; angular or bayonet shaped

______c. Used to elevate the periosteum prior to use of a drill and bits for exposing the middle ear

______d. Used to provide visualization into the ear canal (endaural approach); several sizes are available to fit different sizes and shapes of ear canals

______e. Used on myringotomy to grasp PE tubes and foreign objects; may also be used for grasping other structures such as the stapes when it is to be removed

______f. Used primarily to remove cerumen; usually come in a set of different sizes

______g. Used to make an incision into the eardrum; may be disposable

1. Ear curette (Buck)
2. Ear forceps, alligator type (Hartmann)
3. Ear forceps, thumb style (Lucae, Wilde, Blake)
4. Ear knife (Sexton, Bistoury)
5. Ear specula (Boucheron)
6. Elevator (Lempert)
7. Fascial elevator
8. Mastoid chisel or gouge (Alexander) and mallet
9. Mastoid retractor (Jansen)
10. Mastoid rongeur (Kerrison)
11. Microdrill and burs

6. Select true statements concerning the procedure for a myringotomy with insertion of PE tubes by placing a "T" or "F" next to the true or false statements.

______a. Patient is put in lateral position with head turned so affected ear is up.

______b. Patient is prepped and draped according to circulator's preference.

______c. Through microscopic visualization, the surgeon inserts an ear (aural) speculum in the ear canal.

Written Test

______d. Surgeon makes a long straight incision in the posterior-inferior quadrant (usually) of the tympanic membrane with a skin knife.

______e. Fluid or pus, if present, is suctioned.

______f. Surgeon inserts PE tube, and procedure is then repeated on other ear, if required.

7. Match terms related to the nose on the right with the correct definitions.

______a. Three scroll-like bones which project medially from the lateral wall of the nasal cavity

______b. Air-filled space in the skull which opens into the nasal cavity

______c. Any disorder or perversion of the sense of smell

______d. Inflammation of the nasal mucosa

______e. Bony/cartilaginous partition dividing the nasal cavity into two nasal fossae

______f. Nostril

______g. Greek combining form indicating the nose

______h. Pertaining to the sense of smell

______i. Hemorrhage from the nose; nosebleed

1. Anosmia
2. Epistaxis
3. Hyperosmia
4. Naris
5. Nasal
6. Nasal conchae
7. Nasal septum
8. Olfactory
9. Paranasal sinus
10. Parosmia
11. Rhinitis
12. Rhino
13. Sinus

Written Test

8. Match common nasal operative procedures on the right with the correct descriptions.

______a. Excision and resection of the septum to correct any deviation as the result of injury or a congenital deformity; designed to improve the *functioning* capabilities of the nose

______b. Removal of the diseased portion of the middle turbinate, ethmoidal cells, and diseased tissue in the nasal fossa through a nasal or external approach

______c. Removal of nasal or sinus polyps to improve the patient's breathing ability

______d. Reconstruction of the nose to correct any deformities; designed to improve the *cosmetic appearance* of the nose

______e. Manipulation and mobilization of injured nasal bones and septal cartilage to restore the nose's former appearance and functioning ability

______f. Creation of a new passageway between the maxillary sinuses and the nasal cavity to establish drainage and to remove any diseased tissue, polyps, or tumors; incision is made in the oral mucous membrane above the canine teeth called the canine fossa

______g. Creation of a new passageway between the frontal sinus(es) and the nasal cavity to establish drainage and to remove any diseased tissue, polyps, or tumors; incision is made externally above the eye

______h. Creation of a new passageway for drainage and removal of any diseased tissue in the sphenoidal sinuses; incision is made through an intranasal or external approach

1. Caldwell-Luc
2. Endoscopic sinus surgery
3. Ethmoidectomy
4. Killian operation
5. Nasal artery ligation
6. Polypectomy
7. Repair of nasal fracture
8. Rhinoplasty
9. Septoplasty
10. Sphenoidectomy
11. Turbinectomy

Written Test

9. Select true statements concerning special features of nasal procedures by placing a "T" or "F" next to the true or false statements.

______a. Preoperative diagnostic work up may include x-rays and rhinoscopy.

______b. Nasal procedures on the septum and the mucous membranes of the nasal cavity are usually performed under general anesthesia.

______c. A topical anesthetic such as cocaine is often used prior to a local anesthetic.

______d. The patient is placed in a modified Fowler's position if general anesthesia is to be used.

______e. During prepping, the hair of the nostrils is usually shaved.

______f. The face is prepped with a mild solution. The nostrils may be cleaned very carefully with the aid of cotton applicators.

______g. Supplementary illumination is provided by the spotlight, the operating microscope, and the surgeon's headlight.

______h. The instrumentation set-up required depends on the procedure and the desired approach.

______i. Sponges used in nasal procedures are large and must be used carefully.

______j. Because many colorless solutions may be on the table, they must be accurately and clearly labeled.

______k. Suction must be available at all times. The very fine suction tips used in nasal surgery must be irrigated constantly to avoid blockage.

Written Test

10. Match the specialized instruments for nasal procedures on the right with the correct uses.

Note: Although some uses may have more than one correct answer, only one answer is required.

______a. Used to retract dermis and provide exposure of nostril

______b. Used to elevate septum

______c. Used to scrape sinuses

______d. Used to incise nasal cartilage

______e. Used for grasping tissue in sinuses such as polyps

______f. Very commonly used to open up the nostril to provide visualization

______g. Used to smooth nasal cartilage and bone

______h. Used to suction debris and irrigation from sinuses

1. Antrum cannula
2. Antrum curettes
3. Antrum rasp
4. Endoscope
5. Ethmoid curettes
6. Nasal chisel and mallet
7. Nasal dressing forceps
8. Nasal forceps
9. Nasal (or septum) knife
10. Nasal rasp
11. Nasal saw
12. Nasal scissors
13. Polyp forceps
14. Septum cutting forceps
15. Septum elevator
16. Septum speculum
17. Septum straightener
18. Skin hook
19. Swivel knife

Written Test

11. Arrange in order the procedure for a septoplasty by placing the correct sequence numbers (1-9) in the appropriate blanks.

______a. Patient is placed in the supine position with a slight reverse Trendelenburg tilt and is prepped and draped for surgery.

______b. Anesthesia is administered.

______c. Technologist receives the segments of the septal cartilage in a small basin and preserves in saline solution.

______d. Surgeon closes the incision, packs the nasal cavity, and dresses or splints as desired.

______e. Surgeon opens the nostril with a speculum, incises the mucoperichondrium with a nasal knife, and then deepens the incision with fine, sharp dissecting scissors. Small skin hooks are placed at the wound edges to retract them.

______f. With the mucoperichondrium fully elevated, the surgeon removes the septal cartilage with a nasal forcep.

______g. Surgeon replaces the septal cartilage within the nose.

______h. Surgeon elevates the mucoperichondrium from the septal cartilage using a fine elevator, and removes any spurs from the septum or nasal bone with a nasal/septum cutting forceps.

__7__i. Surgeon examines the septal tissue, and reshapes it as necessary with scissors, rasp, or a special bone crusher that flattens the cartilage.

12. Select true statements concerning endoscopic sinus procedures by placing a "T" or "F" next to the true or false statements.

______a. The position for endoscopic sinus procedures is supine.

______b. Combinations of local and general anesthesia are routinely used.

______c. The affected sinus is entered through 10mm incisions.

______d. Sinus endoscopes come in a variety of sizes including 6°, 30°, 70°, and 120°.

______e. Hemostasis may be obtained by using epinephrine, cautery, or laser.

Written Test

______f. After completion of the needed procedure, an antibiotic ointment may be applied.

______g. Incisions are closed and nasal packing is applied.

13. Match terms related to the oral cavity and throat on the right with the correct definitions.

______a. Intervening space between the vocal folds

______b. Membranous, fibrous bands stretched across the hollow interior of the larynx which vibrate to produce sound

______c. Small, leaf-shaped structure located immediately posterior to the root of the tongue which covers the entrance of the larynx when swallowing, thus preventing food or liquids from entering the airway

______d. Lymphoid tissue located in the oropharyngeal region of the pharynx behind and below the pillars of the fauces

______e. Musculomembranous structure extending from the base of the skull to the area where it becomes continuous with the esophagus; serves as a passageway for air and food

______f. Triangular protrusion on the anterior wall of the larynx which may be seen through the skin; the Adam's apple

______g. Any benign epithelial tumor

______h. Musculocartilaginous structure at the top of the trachea consisting of nine cartilages bound together by an elastic membrane; houses the false and true vocal cords

______i. Inflammation of the mouth

______j. Lymphoid tissue located in the nasopharyngeal region of the pharynx which atrophies with age

1. Adenoids
2. Epiglottis
3. Fauces
4. Glottis
5. Larynx
6. Palatine tonsils
7. Papilloma
8. Pharynx
9. Stomatitis
10. Thyroid cartilage
11. Trachea
12. Vocal cords

Written Test

14. Match common operative procedures on the oral cavity and throat on the right with the correct descriptions.

_____a. Partial or total removal of the tongue, and possibly the floor of the mouth for oral carcinoma

_____b. Partial or total removal of the lower jaw for oral carcinoma extending into the mandible

_____c. Subtotal or total removal of the parotid gland(s) and any associated tumors or lesions

_____d. Removal of the tonsils and adenoids by sharp or blunt dissection

_____e. Direct visualization of the larynx through a fiberoptic endoscope to remove foreign bodies, polyps, and tissue specimens for pathologic examination

_____f. Varying degrees of technique to remove the larynx (partially or totally) and its associated structures to treat carcinoma of the larynx

_____g. En bloc removal of lymphatic chains and all nonvital structures of the neck to arrest the metastatic cancer of the cervical lymphatic chain

_____h. Resection of the posterior soft palate, uvula, and anterior tonsillar pillar to correct obstructive sleep apnea

1. Dental extraction
2. Excision of submaxillary glands
3. Glossectomy
4. Laryngectomy
5. Laryngoscopy
6. Mandibulectomy
7. Parotidectomy
8. Radical neck dissection
9. Tonsillectomy and adenoidectomy
10. Uvulopalatopharyngoplasty

Written Test

15. Complete the following statements concerning special features of operative procedures on the oral cavity and throat by correctly filling in the blanks.

    a. The ________________ setups needed for operative procedures on the oral cavity and throat will depend on whether the external approach or intraoral approach is used.

    b. A ________________ anesthetic is primarily used since many of these procedures are lengthy.

    c. ________________ used in throat procedures are relatively small and are a hazard when bloodsoaked because they can occlude the airway. Therefore, they must be used carefully.

    d. Tonsil sponges with strings attached are used in the tonsil fossa area following a ________________. Their cords are left on the outside of the mouth which helps to decrease the hazard of leaving sponges in this area.

    e. Because many colorless solutions may be on the table, they must be accurately and clearly ________________.

    f. ________________ must be available at all times.

    g. ________________ and positioning for the various oral cavity and throat procedures will vary.

    h. ________________ may be needed when procedures on the salivary glands or lymphatic tissues are performed.

Written Test

16. Match the specialized instruments for throat procedures on the right with the correct uses.

Note: Although these uses may have more than one correct answer, only one answer is required.

______a. Used to visualize the larynx and vocal cords; facilitates the taking of biopsies

______b. Used to hold open the mouth during procedures on the soft palate and throat

______c. Used to free the tonsils

______d. Used to retract the uvula and provide exposure of the pharynx and vocal cords

______e. Used to remove adenoid tissue

1. Adenoid curettes
2. Adenotome
3. Laryngeal grasping forceps
4. Laryngeal mirror
5. Laryngoscope
6. Mouth gag
7. Tongue depressor
8. Tonsil dissector and pillar retractor
9. Tonsil seizing forceps
10. Tonsil knife
11. Tonsil scissors
12. Tonsil snare
13. Uvula retractor

Written Test

17. Select true statements concerning the procedure for a tonsillectomy and adenoidectomy by placing a "T" or "F" next to the true or false statements.

______a. Patient is placed in the prone position with a large roll placed under the shoulders to hyperextend the upper body.

______b. Surgeon inserts a Richardson retractor into the patient's mouth to retract it open.

______c. Surgeon curettes the parotid glands loose and removes them, and technologist cares for them.

______d. Surgeon grasps one tonsil with a clamp or tonsil seizing (grasping) forceps.

______e. Surgeon dissects around the tonsil with the tonsil knife and suction is applied.

______f. Surgeon frees the tonsil from its fossa using a Hurd dissector, tonsil knife, or tonsil scissors.

______g. Technologist receives and cares for the tonsil as a specimen and identifies it as upper or lower.

______h. Surgeon controls the bleeding by suctioning, packing the fossa with a large dissecting sponge, using the electrosurgical unit to cauterize, suturing the fossa, or with the use of lasers.

______i. Procedure is repeated on the other tonsil.

***Permission to duplicate this test is granted.**

Ear, Nose, and Throat Surgery
Unit 7

Unit Evaluation Form

Student Name ______________________ Unit Rating ________

Assignment Sheet 1—Determine Needs for Given
Ear, Nose, and Throat Surgery Cases Rating ____

Comments: ______________________________

____

Written Test Scores

Pretest ____ Posttest ____ Other ____

Other ______________________________

____

Teacher Signature ______________________ Date ________

Student Signature ______________________ Date ________

*Permission to duplicate this form is granted.

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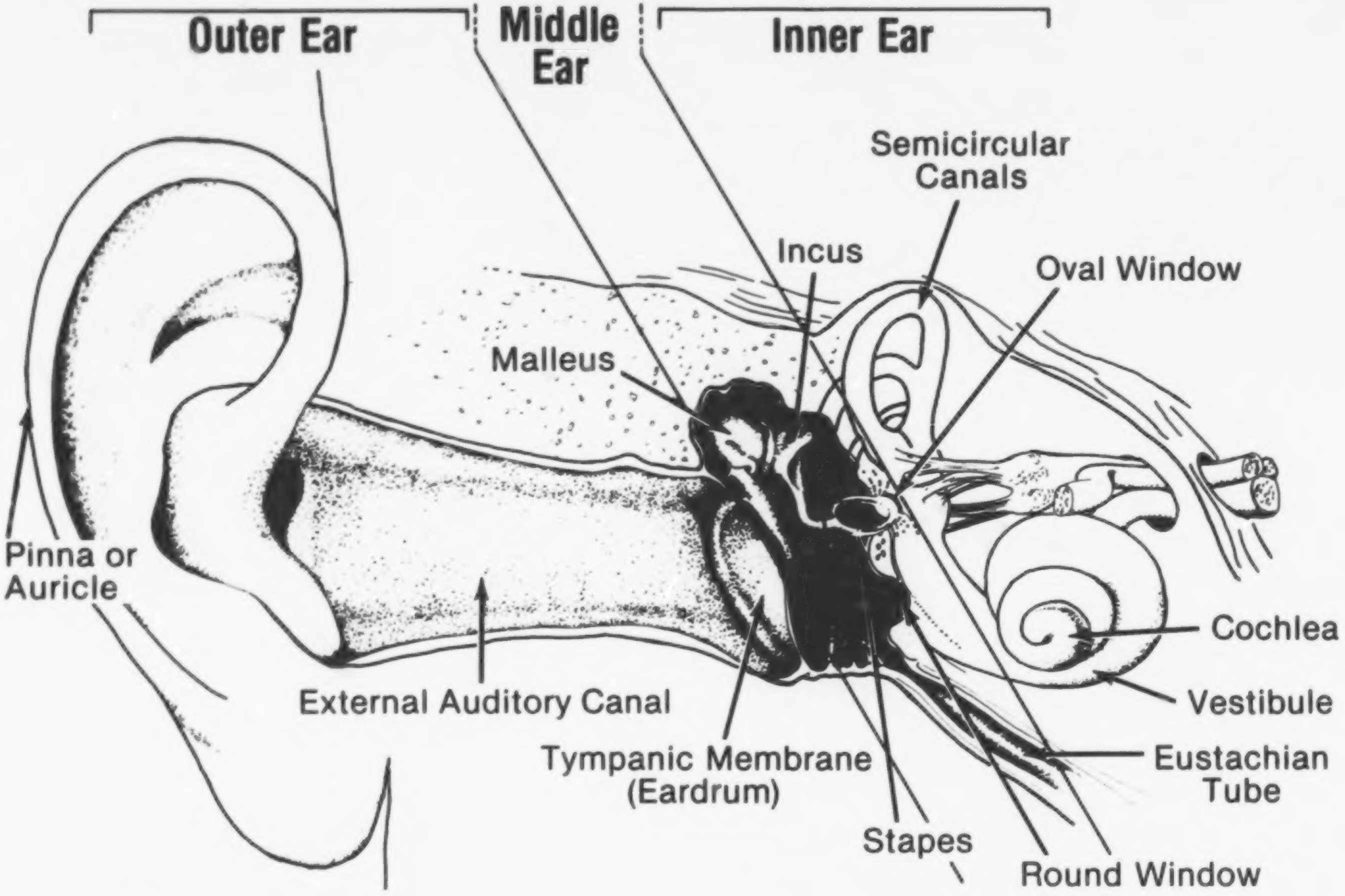
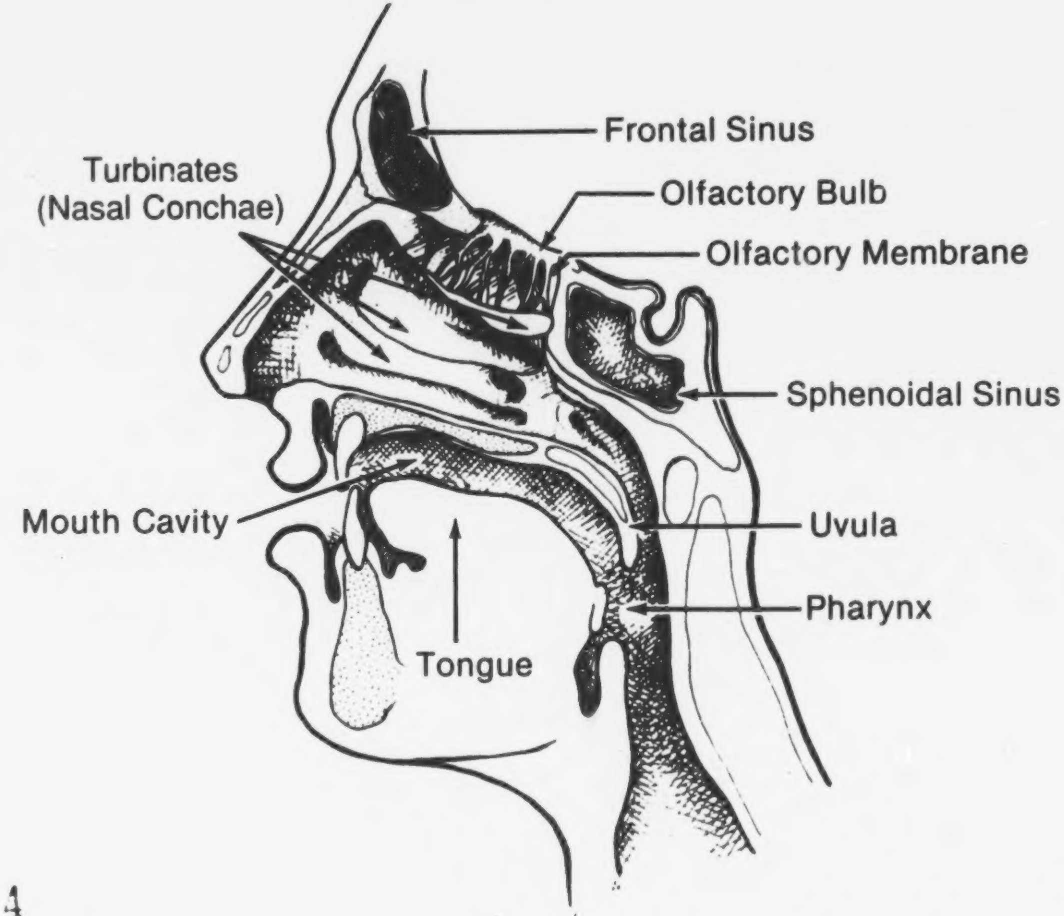
The Ear


Outer Ear
Middle Ear
Inner Ear
Semicircular Canals
Incus
Oval Window
Malleus
Pinna or Auricle
Cochlea
External Auditory Canal
Vestibule
Tympanic Membrane (Eardrum)
Eustachian Tube
Stapes
Round Window

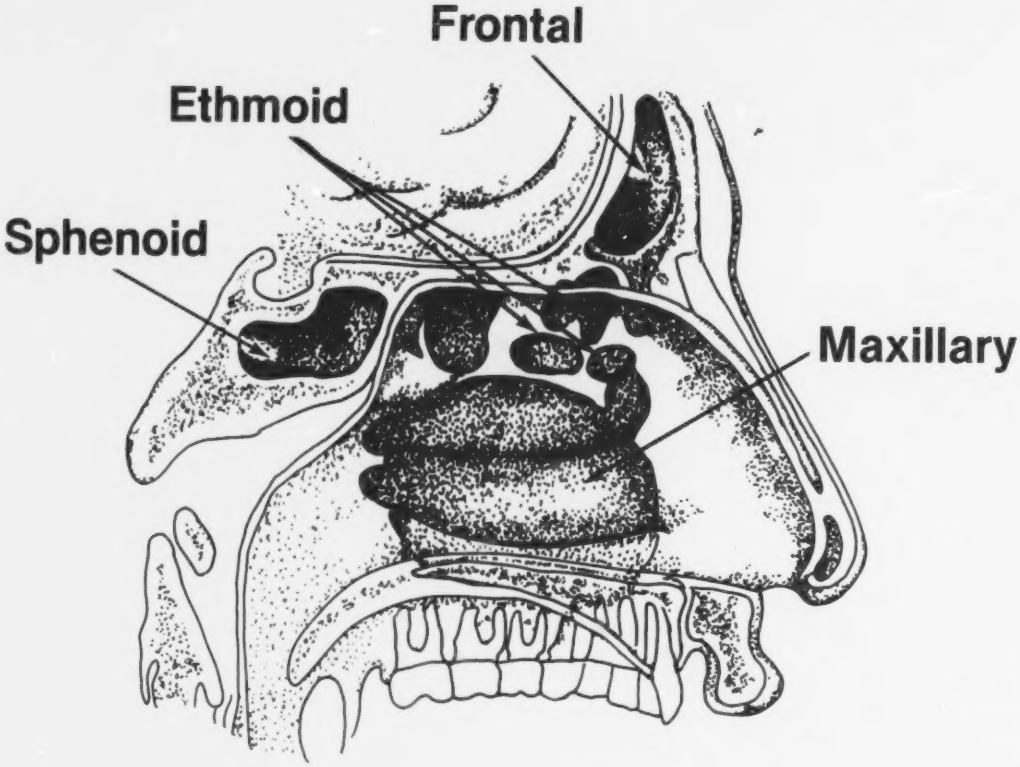
Surgical Procedures, Unit 7
Teacher Page 33

TM 1

The Nose and Sense of Smell


Frontal Sinus
Turbinates
(Nasal Conchae)
Olfactory Bulb
Olfactory Membrane
Sphenoidal Sinus
Mouth Cavity
Uvula
Pharynx
Tongue

Paranasal Sinuses


Frontal
Ethmoid
Sphenoid
Maxillary

Ear, Nose, and Throat Surgery
Unit 7

Information Sheet

1. **Basic purpose of ear, nose, and throat surgery (otorhinolaryngological surgery)** — To correct structural defects due to congenital abnormalities, trauma, or disease processes and to restore function as much as possible.

    a. **Ear** — To improve, preserve, or restore hearing

    b. **Nose** — To restore or improve ventilation, to ensure drainage of sinuses, and to control bleeding (epistaxis)

    c. **Throat** — To prevent chronic infection, to remove neoplasms, or to correct other life-threatening disorders

2. **Terms and definitions related to the ear, otologic conditions, and otologic operative procedures**

    a. **Auditory** — Latin word pertaining to the sense of hearing

    b. **Auditory acuity** — Acuteness or sharpness of hearing

    c. **Aural** — Latin word pertaining to the ear

    d. **Cholesteatoma** — Tumor of desquamated epithelium and cholestrin crystals which often contains infectious bacteria; may be found in the middle ear or mastoid area

    e. **Conduction** — Transmission of sound waves through the conducting media of air or bone

    f. **Conductive loss** — Hearing loss caused by a defect in the external or middle ear

    Note: A loss of hearing may be caused by disease, infection, or trauma.

    g. **Decibel** — Unit for expressing the relative intensity of sounds and for measuring the degree of hearing loss

    h. **Mastoiditis** — Inflammation of the air cells of the mastoid process

    i. **Ménière's disease (or syndrome)** — Disorder of the membranous labyrinth of the inner ear with symptoms including progressive deafness, tinnitus, dizziness, and a sensation of fullness or pressure in the ears

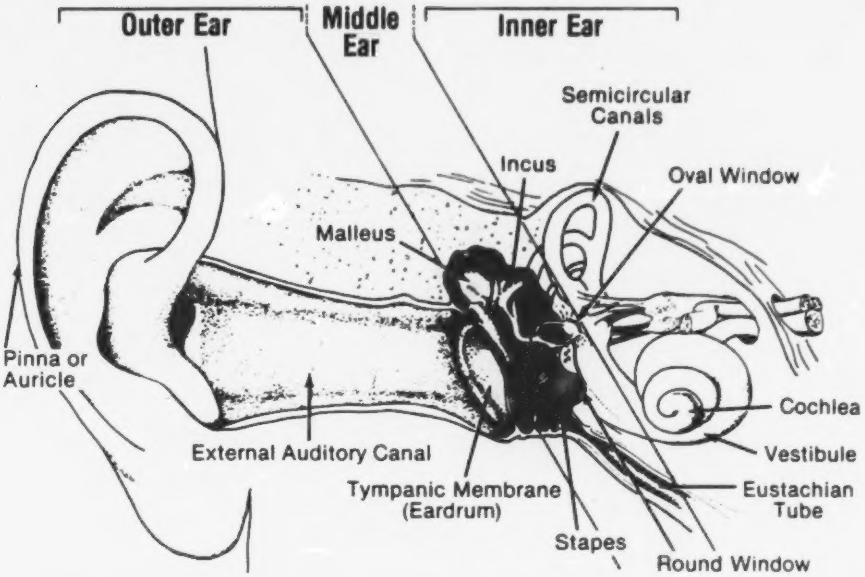
    j. **Ossicle** — Any small bone, especially one of the three small bones of the ear (malleus, incus,and stapes)

Information Sheet

k. **Otitis media** — Inflammation (acute or chronic) of the middle ear

l. **Oto** — Greek word pertaining to the ear

Figure 1 — The ear


Outer Ear
Middle Ear
Inner Ear
Semicircular Canals
Incus
Oval Window
Malleus
Pinna or Auricle
Cochlea
External Auditory Canal
Vestibule
Tympanic Membrane (Eardrum)
Eustachian Tube
Stapes
Round Window

m. **Otology** — Study of the ear, its functions, and diseases

n. **Otosclerosis** — Condition characterized by chronic progressive deafness caused by formation of spongy bone, especially around the oval window with resulting immobility and fixation of the stapes

o. **Pressure equalization (PE) tubes** — Small, drainage tubes placed in the tympanic membrane to prevent the accumulation of fluid in the middle ear

p. **Sensorineural loss** — Hearing loss caused by a defect in the inner ear resulting from damage to nerve tissue and/or sensory paths to the brain

Note: While conductive loss can often be restored by surgery, sensorineural loss usually does not benefit from surgery.

q. **Tinnitus** — Subjective ringing or tinkling sound in the ear

r. **Vertigo** — Sensation of moving around in space or of having objects move around you; makes it difficult to maintain equilibrium

Information Sheet

3. **Common otologic procedures and their descriptions**

   a. **Bone conduction implantation** — Placement of a miniature external sound processing disc which bypasses external and middle ear to stimulate the cochlea

   b. **Common inner ear procedures**

      (1) **Shunting of excess fluid or removal of vestibular labyrinth** to correct incapacitating vertigo

      (2) **Removal of acoustic neurinoma** (benign tumor of the 8th cranial nerve)

      (3) **Implantation of cochlear prosthesis**

      Note: The cochlear nerve must be intact.

   c. **Fenestration procedure** — Reconstruction of the outer and middle parts of the ear by means of a new drum of skin flap or creation of a new window into the internal ear mechanism; performed on patients who have a hearing loss resulting from otosclerosis

   d. **Mastoidectomy** — Removal of diseased bone of the mastoid, along with cholesteatoma, to relieve complications of acute or chronic mastoiditis; several types

      (1) **Simple mastoidectomy** — Removal of the air cells of the mastoid process, without involving the middle ear or external canal

      (2) **Modified radical mastoidectomy** — Removal of the mastoid air cells and the posterior wall of the external ear canal to provide drainage from the mastoid to the canal; preserves the tympanic membrane and the middle ear ossicles

      (3) **Radical mastoidectomy** — Removal of the mastoid air cells, the tympanic membrane, the malleus, and the incus; generally preserves the stapes and the facial nerve

   e. **Myringotomy** — Incision of the tympanic membrane under direct vision to treat acute otitis media or to release fluid in the middle ear; PE tubes are frequently inserted through the tympanic membrane in connection with this procedure

   f. **Stapedectomy** — Removal of the stapes and reestablishment of linkage between the incus and oval window by interposition of a vein graft, polyethylene tube, or other prosthesis

Information Sheet

g. **Stapes mobilization** — Creation of an opening into the vestibule of the labyrinth and reestablishment of a functioning linkage between the incus and the inner ear; performed on patients who have a hearing loss resulting from fixation of the stapes

h. **Tympanoplasty** — Any procedure (five types) performed to repair defects in the tympanic membrane and/or middle ear structures

4. Special features of otologic procedures

a. Power drills and their accompanying small burs are commonly used in otologic procedures to remove bone.

b. Continuous irrigation is required while drilling to prevent clogging of the bur and to remove bone dust in areas where osteogenesis is to be avoided.

c. A special suction-irrigation tip is commonly used during otologic surgery which allows the surgeon to irrigate and suction the wound of fluid and debris at the same time.

d. The operating microscope is used extensively in surgeries on the middle and inner ear since the structures are so small and delicate.

e. Anesthesia may be general or local according to the procedure and the surgeon's preference.

Note: Local anesthesia is frequently used on microsurgical procedures on the middle ear, such as a stapedectomy, because the surgeon can use voice testing during surgery to see immediately if hearing has been improved.

f. Skin preparation and shave

(1) For most major procedures, the hair is removed and then skin is shaved at least 1½" from the site of the proposed incision.

Note: The hair is removed mainly from the area above the ear for an endaural approach and from behind the ear for a postauricular approach.

(2) A mild soap and water solution is commonly used to cleanse the outer ear and its surrounding skin.

Caution: Prep solutions must be used carefully since they can be irritating and very painful if they touch a perforated eardrum.

Information Sheet

g. Gloves must be powder-free since granuloma formation in the ear can cause irreversible hearing loss.

h. Tissue grafts must be kept from drying out prior to use.

Note: However, some surgeons intentionally dry a temporalis fascia graft to facilitate handling.

i. Since many electrical appliances are used during otologic surgery, every effort must be made to protect the patient from electrical hazards.

j. The patient is commonly placed in a modified supine position with the head turned to the side and the affected ear uppermost. The head must be immobilized and supported with a pad or a brace.

Note: The table will have to be tilted laterally so the surgeon can have the proper visualization of the ear through the microscope.

k. Draping

(1) All drapes used must be lint-free to prevent granuloma formation.

(2) Three, folded lengthwise towels or plastic drapes are placed around the operative site creating a triangular-shaped operative field around the affected ear.

(3) A fenestrated sheet is unfolded over the patient and table with the operative site in view through the opening.

(4) The draped tables and the operating microscope are positioned around the patient.

(5) The surgeon adjusts the microscope before it is draped so that only fine manipulation is required during surgery.

l. Because many colorless solutions may be on the table, they must be accurately and clearly labeled.

m. Hemostatic aids must be ready at all times which may include:

(1) Absorbable gelatin sponges

(2) Cautery (monopolar or bipolar) or laser

(3) Bone wax (when the mastoid or temporal bones are entered)

(4) Saline moistened cottonoids

Information Sheet

n. Special equipment may include:

  (1) Nerve stimulator

  (2) Evoked potential audiometer (to check hearing)

  (3) Laser

  Examples: Argon (for vascular tumors), Carbon Dioxide, Nd:YAG, KTP

5. Specialized instruments for otological procedures

Note: Many other specialized instruments could be added to this list. Complete setup for otological procedures will also include basic general instruments.

a. **Ear curette (Buck)** — Used primarily to remove cerumen (earwax); usually come in a set of different sizes

b. **Ear forceps, alligator type (Hartmann)** — Used on myringotomy to grasp PE tubes and foreign objects; may also be used for grasping other structures such as the stapes when it is to be removed

c. **Ear forceps, thumb style (Lucae, Wilde, Blake)** — Used to grasp tissue or foreign objects in the ear canal, to pack ear canal postoperatively, or to grasp tissue in mastoidectomy; angular or bayonet shaped

d. **Ear (myringotomy) knife (Sexton, Bistoury)** — Used to make an incision into the eardrum (tympanic membrane); may be disposable

e. **Ear (aural) specula (Boucheron)** — Used to provide visualization into the ear canal (endaural approach); several sizes are available to fit different sizes and shapes of ear canals

f. **Elevator (Lempert)** — Used to elevate the periosteum prior to use of a drill and bits for exposing the middle ear

g. **Fascial elevator** — Used to take tissue graft for tympanoplasty

h. **Mastoid chisel or gouge (Alexander) and mallet** — Used to remove mastoid tissue

i. **Mastoid retractor (Jansen)** — Used for postauricular incisions to expose the mastoid area

j. **Mastoid rongeur (Kerrison)** — Used to remove bits of diseased mastoid air cells

k. **Microdrill and burs** — Used to expose middle ear and to remove diseased mastoid air cells in a mastoidectomy

Information Sheet

6. **Procedure for a myringotomy with insertion of PE (pressure equalization) tubes**

   a. Patient is positioned in supine with head turned so affected ear is up.

   b. Patient is prepped and draped according to surgeon's preference.

   Note: A disposable myringotomy set may be used.

   c. Through microscopic visualization, the surgeon inserts an ear (aural) speculum in the ear canal.

   d. Surgeon makes a small curved incision in the posterior-inferior quadrant (usually) of the tympanic membrane with a sharp ear (myringotomy) knife.

   Note: A culture may be taken to determine the type of organism present.

   e. Fluid or pus, if present, is suctioned with a Frazier or Baron suction tip.

   f. Surgeon inserts PE tube, which has been positioned on alligator ear forceps, into the incision. (Never with gloved hands.)

   g. Antibiotic drops may be instilled.

   h. Patient's head is turned, and procedure is repeated on other ear, if required.

7. **Terms and definitions related to the nose, nasal conditions, and nasal operative procedures**

   a. **Anosmia** — Absence of the sense of smell

   b. **Epistaxis** — Hemorrhage from the nose; nosebleed

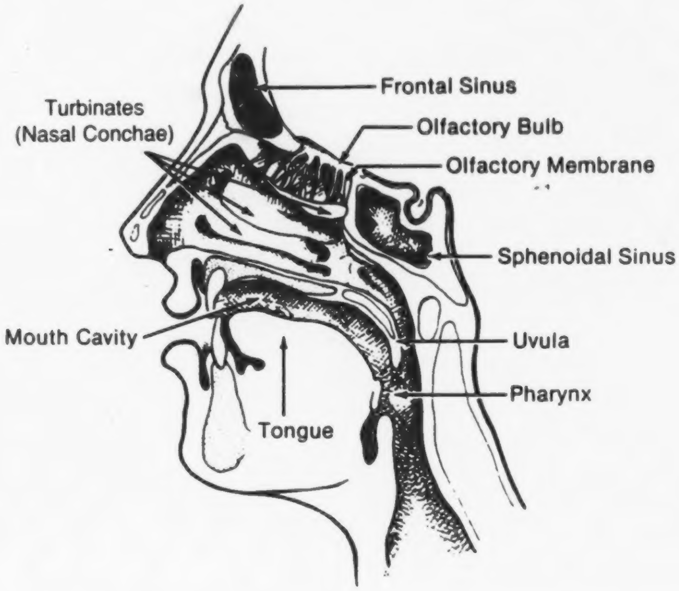
   c. **Hyperosmia** — Abnormal sensitiveness to odors

   d. **Naris (pl. nares)** — Nostril

Information Sheet

e. **Nasal** — Latin word pertaining to the nose

Figure 2 — The nose and sense of smell


Frontal Sinus
Turbinates (Nasal Conchae)
Olfactory Bulb
Olfactory Membrane
Sphenoidal Sinus
Mouth Cavity
Uvula
Pharynx
Tongue

f. **Nasal conchae (turbinates)** — Three scroll-like bones which project medially from the lateral wall of the nasal cavity

g. **Nasal septum** — Bony/cartilaginous partition dividing the nasal cavity into two nasal fossae

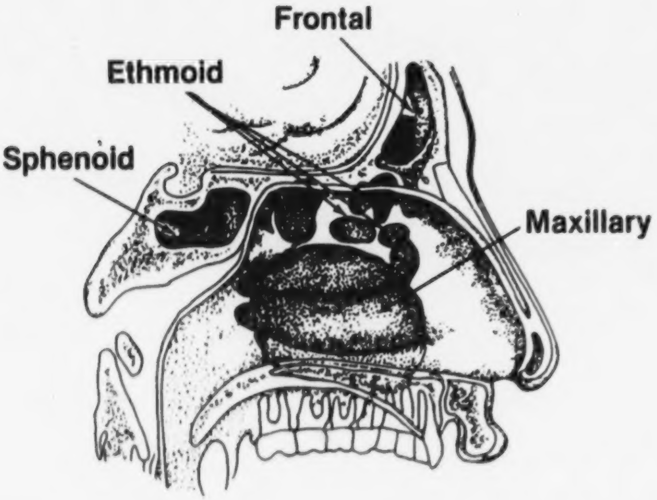
h. **Olfactory** — Pertaining to the sense of smell

Information Sheet

i. **Paranasal sinus** — Air-filled space in the skull which opens into the nasal cavity

Note: The paranasal sinuses include the maxillary, frontal, ethmoid, and sphenoid sinuses.

Figure 3 — Paranasal sinuses



j. **Parosmia** — Any disorder or perversion of the sense of smell

k. **Rhinitis** — Inflammation of the nasal mucosa

l. **Rhino** — Greek combining form indicating the nose

m. **Sinus** — Cavity within a bone

8. **Common nasal operative procedures**

a. **Caldwell-Luc (radical antrostomy)** — Creation of a new passageway between the maxillary sinuses and the nasal cavity to establish drainage and to remove any diseased tissue, polyps, or tumors; incision is made in the oral mucous membrane above the canine teeth called the canine fossa

b. **Endoscopic sinus surgery** — Permits direct visualization of the paranasal sinuses and anatomy of lateral nasal walls; allows for biopsy or removal of polyps, diseased mucosa, or tissue obstructions with preservation of some mucosa and restoration of drainage; laser may be used

Information Sheet

c. **Ethmoidectomy** — Removal of the diseased portion of the middle turbinate, ethmoidal cells, and diseased tissue in the nasal fossa through a nasal or external approach

d. **Killian operation** — Creation of a new passageway between the frontal sinus(es) and the nasal cavity to establish drainage and to remove any diseased tissue, polyps, or tumors; incision is made externally above the eye

e. **Nasal artery ligation** — Ligation of a branch of the internal maxillary artery microscopically to control persistent nasal hemorrhage by reducing the blood supply to the posterior portion of the nose

f. **Polypectomy** — Removal of nasal or sinus polyps to improve the patient's breathing ability

g. **Repair of nasal fracture** — Manipulation and mobilization of injured nasal bones and septal cartilage to restore the nose's former appearance and functioning ability

h. **Rhinoplasty** — Reconstruction of the nose to correct any deformities; designed to improve the *cosmetic appearance* of the nose

i. **Septoplasty** — Excision and resection of the septum to correct any deviation as the result of injury or a congenital deformity; designed to improve the *functioning* capabilities of the nose

Note: The procedure to correct a deviated septum is referred to by many terms including septoplasty, nasal septal reconstruction (NSR), and submucous resection of the septum (SMR). These terms may be used interchangeably.

j. **Sphenoidectomy** — Creation of a new passageway for drainage and removal of any diseased tissue in the sphenoidal sinuses; incision is made through an intranasal or external approach

k. **Turbinectomy** — Removal of portions of the inferior and middle turbinates to increase aeration and drainage and to relieve pressure against the floor of the nose

9. **Special features of nasal procedures**

a. Preoperative diagnostic work up may include:

(1) X-rays (when nasal fractures are suspected)

(2) Computerized tomography

(3) Rhinoscopy (to visually inspect the nasal passages)

Information Sheet

b. Anesthesia

(1) Nasal procedures on the septum and the mucous membranes of the nasal cavity are usually performed under local anesthesia.

(2) More radical procedures that require entry into the sinuses are usually performed under general anesthesia.

(3) A topical anesthetic such as cocaine is often used prior to a local anesthetic.

Note: Cocaine is **NEVER** injected. When cocaine or another similar narcotic agent is used, a thiopental sodium (Pentothal) setup and oxygen equipment should be in the room.

(4) The local anesthetic most frequently used is lidocaine hydrochloride 1 or 2 percent.

(5) Epinephrine, which acts as a vasoconstrictor and reduces the blood loss during surgery, is often used as an additive to the local anesthetic.

c. Positioning

(1) The patient is commonly placed in a modified Fowler's (reclining) position if local anesthesia is to be used.

(2) The patient is placed in the supine position if general anesthesia is to be used.

d. Prepping

(1) The hair of the nostrils may be clipped with fine, curved scissors.

(2) Sterile ointment may be put into the eyes of the patient to protect them from the prep solution.

(3) The face is prepped with a mild solution, and the nostrils may be cleaned very carefully with the aid of cotton applicators.

e. Draping is performed as for other facial procedures using a head drape and split sheet or drape to cover the rest of the patient's body.

f. Supplementary illumination is provided by the spotlight, the operating microscope, and the surgeon's headlight.

g. The instrumentation set-up required depends on the procedure and the desired approach (intranasal, external, or canine fossa.)

Information Sheet

h. Sponges used in nasal procedures are relatively small and are a hazard when bloodsoaked because they can occlude the airway. Therefore, they must be used carefully and accounted for properly. A "throat pack" may be used if general anesthesia is utilized.

i. Because many colorless solutions may be on the table, they must be accurately and clearly labeled.

j. Suction must be available at all times. The very fine suction tips used in nasal surgery must be irrigated constantly to avoid blockage.

k. Hemostatic aids must be ready at all times.

Examples: Monopolar or bipolar cautery; absorbable gelatin; absorbable collagen; microfibrillar collagen; oxidized cellulose; carbon dioxide, Nd:YAG, and KTP lasers

l. Postnasal packs are commonly used to control bleeding.

10. Specialized instruments for nasal procedures

Note: Many other specialized instruments could be added to this list. Complete setup will also include basic general instruments.

a. **Antrum cannula (Killian)** — Used to suction debris and irrigation from sinuses

b. **Antrum curettes (Coakley) and ethmoid curettes (Pratt, Faulkner)** — Used to scrape sinuses

c. **Antrum rasp, curved (Weiner)** — Used to mechanically smooth nasal cartilage and bone (during septoplasty); used to enter sinuses after initial incision and dissection are completed

d. **Endoscope** — Used for visualization of sinuses; come in sets of 6°, 30°, 70°. and 120°

e. **Nasal chisel (Cottle, Sheehan) and mallet** — Used to dissect the nasal cartilage and nasal periosteum in septoplasty and rhinoplasty procedures

f. **Nasal dressing forceps (Noyes)** — Used to insert and remove nasal packing and remove foreign bodies from nasal cavity

g. **Nasal forceps (Hartmann)** — Used to grasp and remove septal cartilage, nasal polyps, and foreign bodies from nasal cavity

h. **Nasal (or septum) knife (Cottle, Joseph)** — Used to incise nasal cartilage (septum)

Information Sheet

i. **Nasal rasp (Fomon)** — Used to reshape the nasal hump (in rhinoplasty)

j. **Nasal saw (Joseph)** — Used to dissect the nasal cartilage and periosteum

k. **Nasal scissors (Knight, Joseph)** — Used to dissect mucous membrane around the septum and undermining around the nasal bone; used frequently on rhinoplasty

l. **Polyp forceps (Watson-Williams)** — Used for grasping tissue in sinuses such as polyps

m. **Septum cutting forceps (Kofler, Jansen-Middleton)** — Used to remove or trim septal cartilage (in septoplasty) and the nasal hump (in rhinoplasty)

n. **Septum elevator (Freer)** — Used to elevate septum

o. **Septum speculum (Cottle, Killian)** — Very commonly used to open up the nostril to provide visualization

p. **Septum straightener (Ash, Walsham)** — Used to straighten nasal septum and in reduction of nasal fractures

q. **Skin hook (Cottle, Joseph)** — Used to retract dermis and provide exposure of nostril; used on such procedures as septoplasty/rhinoplasty where layers of tissue are dissected or incisions are made in nasal mucosa

r. **Swivel knife (Ballenger)** — Used to elevate nasal mucous membrane around the septum; may be straight or bayonet shaped

11. **Procedure for a septoplasty**

a. Patient is placed in the supine position with a slight reverse Trendelenburg tilt and is prepped and draped for surgery.

b. Anesthesia is administered.

Note: Most nasal surgery is performed under a local anesthetic. For this the surgeon will usually swab the nasal cavity with cocaine solution or crystals before injecting the local anesthetic.

c. Surgeon opens the nostril with a speculum, incises the mucoperichondrium with a nasal knife, and then deepens the incision with fine, sharp dissecting scissors. Small skin hooks are placed at the wound edges to retract them.

d. Surgeon elevates the mucoperichondrium from the septal cartilage using a fine (Freer) elevator, and removes any spurs from the septum or nasal bone with nasal/septum cutting forceps.

e. With the mucoperichondrium fully elevated, the surgeon removes the septal cartilage with a nasal forcep.

Information Sheet

f. Technologist receives the segments of the septal cartilage in a small basin and preserves in saline solution.

g. Surgeon examines the septal tissue, and reshapes it as necessary with scissors, rasp, or a special bone crusher that flattens the cartilage.

h. Surgeon replaces the septal cartilage within the nose.

i. Surgeon closes the incision, packs the nasal cavity, and dresses or splints as desired.

Note: An ice pack may be applied at this time.

12. **Endoscopic sinus procedure**

a. Patient is placed in supine position, face and throat are prepped, and the patient is draped as for other paranasal procedures.

b. Anesthesia is administered. This is usually topical and local with IV sedation.

Note: The nasal cavity is topically swabbed followed by local administration along with IV sedation. In some cases general anesthesia may be administered.

c. The affected sinus is entered through a 5 mm incision.

Note: The maxillary and ethmoid sinuses are the most common sites for endoscopic procedures.

d. A second incision may be made using a rasp to facilitate instrumentation such as suction, curettes, and forceps.

e. The sinus is visualized and diseased tissue may be cultured, biopsied, or removed, and irrigation and washing can be obtained.

Note: A 6°, 30°, 70°, or 120° endoscope is used with endoscopic forceps, straight or angled. Laser may be used through an additional 5 mm incision.

f. Hemostasis is accomplished by the use of epinephrine and cautery or laser.

g. After the needed procedure is accomplished, the instrumentation and endoscope are removed; antibiotic ointment may be applied using a 10cc syringe with a small catheter on the end to ensure proper placement.

h. Incisions are left open and nasal packing is **not** needed. A moustache dressing is applied.

Information Sheet

13. **Terms and definitions related to conditions and procedures on the oral cavity and throat**

    a. **Adenoids** — Lymphoid tissue located in the nasopharyngeal region of the pharynx which atrophies with age

    b. **Epiglottis** — Small, leaf-shaped structure located immediately posterior to the root of the tongue which covers the entrance of the larynx when swallowing, thus preventing food or liquids from entering the airway

    c. **Fauces** — Constricted opening of the oropharynx into the oral cavity; is bound by the soft palate, base of the tongue, and the palatine arches

    d. **Glottis** — Intervening space between the vocal folds

    e. **Larynx** — Musculocartilaginous structure at the top of the trachea consisting of nine cartilages bound together by an elastic membrane; houses the false and true vocal cords

    f. **Palatine tonsils** — Lymphoid tissue located in the oropharyngeal region of the pharynx behind and below the pillars of the fauces

    g. **Papilloma** — Any benign epithelial tumor

    h. **Pharynx** — Musculomembranous structure extending from the base of the skull to the area where it becomes continuous with the esophagus; serves as a passageway for air and food

    i. **Stomatitis** — Inflammation of the mouth

    j. **Thyroid cartilage** — Triangular protrusion on the anterior wall of the larynx which may be seen through the skin; the Adam's apple

    k. **Trachea** — Cartilaginous tube extending from the larynx to the bronchial tubes; lies in front of the esophagus

    l. **Vocal cords** — Membranous, fibrous bands stretched across the hollow interior of the larynx which vibrate to produce sound

14. **Common operative procedures on the oral cavity and throat**

    a. **Dental extraction** — Removal of one or more teeth in the presence of gingival or tooth disease

    Note: If all of the patient's teeth are to be removed, the procedure is referred to as a full mouth extraction. Dental procedures are primarily performed by oral surgeons. While many of these procedures are performed in the surgeon's office, special circumstances may indicate that they be performed in the operating room.

Information Sheet

b. **Excision of submaxillary glands** — Partial or total removal of a submaxillary (submandibular) salivary gland; performed to remove mixed tumors or multiple calculi associated with chronic infection

c. **Glossectomy** — Partial or total removal of the tongue, and possibly the floor of the mouth for oral carcinoma

d. **Laryngectomy** — Varying degrees of technique to remove the larynx (partially or totally) and its associated structures to treat carcinoma of the larynx

   (1) Total laryngectomy — Removal of the entire larynx (epiglottis, false cords, and true cords), hyoid bone, cricoid cartilage, and the upper tracheal rings; patient loses voice and breathes through a permanent stoma in the neck

   (2) Supraglottic laryngectomy (horizontal incision) — Removal of the epiglottis, false vocal cords, and the hyoid bone; both of the true vocal cords are preserved which leaves the patient with a normal voice

   (3) Hemilaryngectomy (vertical incision) — Removal of one true vocal cord, one false cord, the arytenoid, and half of the thyroid cartilage; leaves patient with a hoarse voice

e. **Laryngoscopy** — Direct visualization of the larynx through a fiberoptic endoscope (laryngoscope) to remove foreign bodies, polyps, and tissue specimens for pathologic examination

f. **Mandibulectomy** — Partial or total removal of the lower jaw for oral carcinoma extending into the mandible

g. **Parotidectomy** — Subtotal or total removal of the parotid gland(s) and any associated tumors or lesions

h. **Radical neck dissection** — En bloc removal of lymphatic chains and all nonvital structures of the neck to arrest the metastatic cancer of the cervical lymphatic chain

i. **Tonsillectomy and adenoidectomy (T and A)** — Removal of the tonsils and adenoids by sharp or blunt dissection

   (1) Tonsils are removed to remedy chronic tonsillitis.

   (2) Adenoids are removed to facilitate breathing, prevent recurrent attacks of otitis media, and to restore a hearing loss due to obstruction of the eustachian tube.

j. **Uvulopalatopharyngoplasty (UPP)** — Resection of the posterior soft palate, uvula, and anterior tonsillar pillar to correct obstructive sleep apnea

Information Sheet

15. Special features of operative procedures on the oral cavity and throat

a. The instrumentation setups needed for operative procedures on the oral cavity and throat will depend on the approach.

(1) The external approach used on some throat procedures requires general operating instruments and techniques.

(2) The intraoral approach used on oral cavity and some throat procedures (such as tonsillectomy) requires special lighting, longer instruments, and some specialized instruments.

b. A general anesthetic is primarily used since many of these procedures are lengthy.

Note: Exceptions to this are procedures performed in the surgeon's or dentist's office under local anesthesia.

c. Sponges used in throat procedures are relatively small and are a hazard when bloodsoaked because they can occlude the airway. Therefore, they must be used carefully.

d. Tonsil sponges with strings attached are used in the tonsil fossa area following a tonsillectomy. Their cords are left on the outside of the mouth which helps to decrease the hazard of leaving sponges in this area.

e. Because many colorless solutions may be on the table, they must be accurately and clearly labeled.

f. Suction must be available at all times.

g. Hemostatic aids must be ready at all times.

h. Draping and positioning for the various oral cavity and throat procedures will vary.

i. When salivary glands or lymphatic tissues are involved, a drain and nerve stimulator may be needed.

16. Specialized instruments for throat procedures

Note: Many other specialized instruments could be added to this list. Complete setup will also include basic general instruments.

a. **Adenoid curettes (Barnhill)** — Used to scrape or remove adenoid tissue

b. **Adenotome (LaForce)** — Used to remove adenoid tissue

Information Sheet

c. **Laryngeal grasping forceps (Fraenkel, Jackson)** — Used to grasp and remove tissue in the posterior pharynx and larynx (such as tissue for biopsy or foreign object)

d. **Laryngeal mirror** — Used to assist with visualization of oral cavity, teeth, pharynx, and laryngeal opening; also is occasionally used to retract uvula

e. **Laryngoscope** — Used to visualize the larynx and vocal cords; facilitates the taking of biopsies

f. **Mouth gag (Jennings, McIvor, Davis, Denhart)** — Used to hold open the mouth during procedures on the soft palate and throat

g. **Tongue depressor (Wieder, Andrews)** — Used to retract the tongue to provide visualization of the posterior oral cavity and throat

h. **Tonsil dissector and pillar retractor (Hurd)** — Used to retract the tonsillar pillar area and assist with dissection of tonsils

i. **Tonsil seizing (grasping) forceps (White)** — Used to grasp tonsillar tissue

j. **Tonsil knife (Fisher, hockey stick)** — Used to free the tonsils

k. **Tonsil scissors (Boettcher)** — Used to free tonsil from its attachment to the pillar

l. **Tonsil snar (Eve, Tyding)** — Used to remove tonsil from its pedicle

m. **Uvula retractor (Lothrop, Love)** — Used to retract the uvula and provide exposure of the pharynx and vocal cords

17. **Procedure for a tonsillectomy and adenoidectomy (T and A)**

a. Patient is placed in the supine position with a small roll placed under the shoulders to hyperextend the neck, and then is draped.

Note: An adult patient under local anesthesia may be placed in a modified Fowler's position.

b. Surgeon inserts a mouth gag into the patient's mouth to retract it open.

c. Surgeon removes the adenoids with adenotomes and curettes the fossa.

d. Technologist receives the adenoids as specimens and cares for them as required.

e. Surgeon grasps one tonsil with a clamp or tonsil seizing (grasping) forceps.

Information Sheet

f. Surgeon dissects around the tonsil with the tonsil knife, and suction is applied.

Note: The technologist may need to assist with the suctioning. CO_2, Nd:YAG, argon, or KTP lasers may be used to cut the tonsil from its fossa.

g. Surgeon frees the tonsil from its fossa using a Hurd dissector, tonsil knife, or tonsil scissors.

Note: Some surgeon's may use a tonsil snare to free the tonsil.

h. Technologist receives and cares for the tonsil as a specimen and identifies it as right or left if required.

i. Surgeon controls the bleeding by suctioning, packing the fossa with a large dissecting sponge, using the electrosurgical unit to cauterize, suturing the fossa, or using lasers.

j. Procedure is repeated on the other tonsil.

Note: The patient is usually placed on his/her side before transportation to the recovery room.

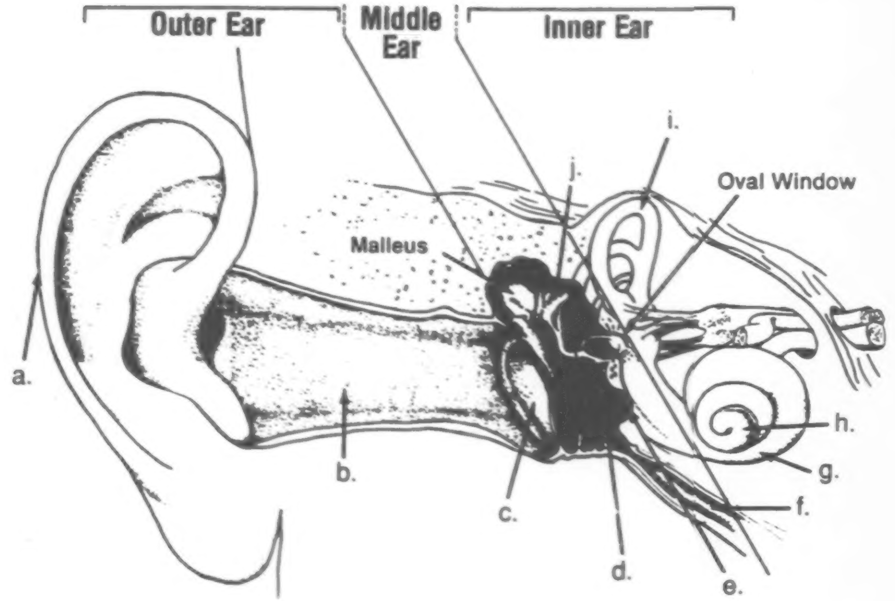
Ear, Nose, and Throat Surgery
Unit 7

Student Supplement 1—Review Anatomy of the Ear

Name ________________________ Date ________________

Directions: Identify the following structures of the ear, and place your answers in the blanks provided.

a.	________________	f.	________________
b.	________________	g.	________________
c.	________________	h.	________________
d.	________________	i.	________________
e.	________________	j.	________________


Outer Ear
Middle Ear
Inner Ear
i.
j.
Oval Window
Malleus
a.
b.
c.
d.
e.
f.
g.
h.

Ear, Nose, and Throat Surgery
Unit 7

Student Supplement 2—Review Anatomy of the Nasal Area

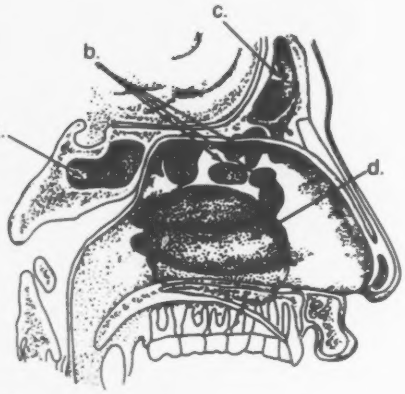
Name ______________________ Date ______________

Directions: Identify the following structures of the nasal area, and place your answers in the blanks provided.

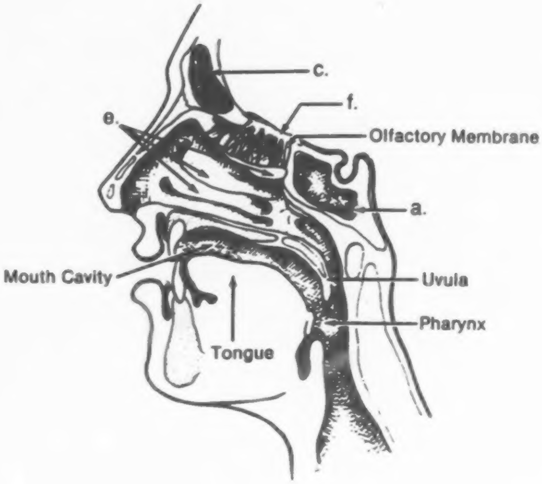
a. ____________ d. ____________

b. ____________ e. ____________

c. ____________ f. ____________



Sinuses


c.
f.
e.
Olfactory Membrane
a.
Mouth Cavity
Uvula
Pharynx
Tongue

Ear, Nose, and Throat Surgery
Unit 7

Student Supplement 3—Review Basic Concepts of Ear, Nose, and Throat Surgery

Name ______________________________ Date ____________________

Directions: Select the best answer for each question or statement. Circle the answers or place the correct letters in the blanks provided.

______ 1. A disease of the membranous labyrinth of the inner ear with symptoms including deafness, tinnitus, dizziness, and a sensation of fullness or pressure in the ears is:

a. Mastoiditis
b. Ménière's syndrome
c. Otitis media
d. Otosclerosis

______ 2. Ringing of the ears is:

a. Vertigo
b. Tinnitus
c. Sensorineural loss
d. All of the above

______ 3. It is important that gloves be powder-free and drapes be lint-free during ear procedures

a. To prevent granuloma formation.
b. To prevent premature healing.
c. To speed up scar formation.
d. To enhance cosmetic results.

______ 4. ________________ are used to equalize pressure and aid in drainage of the middle ear.

a. PE tubes
b. RE tubes
c. EP tubes
d. ER tubes

______ 5. ________________ is a nosebleed.

a. Anosmia
b. Epistaxis
c. Hyperosmia
d. Olfactoria

Student Supplement 3

______ 6. Which term refers to the scroll-like bones of the nose?

a. Nasal conchae
b. Paranasal conchae
c. Nasal septum
d. Paranasal turbines

______ 7. A procedure designed to correct a deviated septum is

a. Rhinoplasty
b. Polypectomy
c. Caldwell-Luc
d. Septoplasty

______ 8. A procedure designed to cosmetically improve the nose is:

a. Rhinoplasty
b. Polypectomy
c. Caldwell-Luc
d. Septoplasty

______ 9. Nasal procedures on the septum are commonly performed under ____________________ anesthesia.

a. General
b. Local
c. Spinal
d. Epidural

______10. ____________________ is used as a vasoconstrictor during nasal procedures.

a. Xylocaine®
b. Epinephrine
c. Cocaine
d. Papaverine®

______11. Packing is used routinely postoperatively on:

a. Nasal procedures
b. Ear procedures
c. Throat procedures
d. Sinus procedures

Student Supplement 3

______12. __________________ is a procedure to partially or totally remove the tongue for cancer.

a. Mandibulectomy
b. Glossectomy
c. Parathyroidectomy
d. Ethmoidectomy

______13. __________________ allows direct visualization of the larynx.

a. Tracheotomy
b. Otoscopy
c. Laryngoscopy
d. Nasoscopy

______14. En bloc removal of lymphatic chains and all nonvital structures of one side of the neck is:

a. Supraglottic laryngectomy
b. Hemilaryngectomy
c. Radical neck dissection
d. Radical mastoidectomy

______15. You need a roll under the patient's shoulder for hyperextension on the following procedure:

a. T & A
b. Septoplasty
c. Myringotomy
d. Polypectomy

______16. You need a pillar retractor on:

a. T & A
b. Septoplasty
c. Myringotomy
d. Polypectomy

______17. The suction most likely used on a procedure on the maxillary sinus is:

a. Poole
b. Yankauer
c. Killian
d. Laryngeal

Student Supplement 3

______18. All of the following are myringotomy instruments EXCEPT:

a. Hartmann forceps
b. Cottle speculum
c. Buck curette
d. Sexton knife

______19. Which of the following statements is FALSE regarding a septoplasty?

a. The position is Trendelenburg.
b. The septal cartilage is removed and placed in saline.
c. The anesthesia is local.
d. Nasal packing is commonly used along with splints.

______20. The ________________ sinus is entered during a Caldwell-Luc to allow for the removal of polyps and any diseased tissue.

a. Ethmoid
b. Frontal
c. Maxillary
d. Sphenoid

______21. The ________________ are the membranous fibrous bands that stretch across the hollow interior of the larynx.

a. Adenoid tissue
b. Epiglottic bands
c. Thyroid cartilage
d. Vocal cords

______22. The ________________ is a triangular protrusion on the anterior wall of the larynx and is referred to as the "Adam's apple".

a. Cricoid cartilage
b. Laryngeal cartilage
c. Thyroid cartilage
d. Vocal cords

Student Supplement 3

______23. A laryngectomy that involves the removal of one true vocal cord, one false vocal cord, and a portion of the thyroid cartilage is a __________________.

a. Hemilaryngectomy
b. Supraglottic laryngectomy
c. Total laryngectomy
d. Radical laryngectomy

______24. During a myringotomy, pressure equalizing tubes are:

a. Inserted with an ear speculum
b. Handled and inserted with gloves and no instruments.
c. Picked up and inserted with Hartmann forceps.
d. Passed to the surgeon on a damp sponge.

______25. The procedure used to correct sleep apnea is:

a. Parotidectomy
b. Glossectomy
c. Radical neck dissection
d. Uvulopalatopharyngoplasty

Ear, Nose, and Throat Surgery
Unit 7

Assignment Sheet 1—Determine Needs for Given Ear, Nose, and Throat Surgery Cases

Name ______________________________ Overall rating ____________

Evaluation criteria	**Rating**
Answers are appropriate	______
Drawings are accurate	______

Directions: Read each of the following cases, and fill in the blanks with the appropriate information required. Refer to the information sheets as needed. When drawing the Mayo setups, you may either draw the actual instruments (with labels if confusing) **or** write in only the names of the instruments in their correct locations on the Mayo.

Case A: You are assigned to scrub, set up, and pass on a bilateral myringotomy on a 2-year-old female.

1. Type of anesthesia to be used — ______________________________
2. Position — ______________________________
3. After the microscope is in position, the first instrument to be used to open the ear canal is a/an ______________________________
4. If a large amount of cerumen is present, an instrument that could be used to remove the cerumen is a/an ______________________________
5. The incision is made with a/an ______________________________

   into the ____________________ quadrant of the tympanic membrane.
6. Suction such as Frazier is used if pus is encountered and a culture may be taken. Then the PE tube is mounted and inserted using a/an ____________________.

   Avoid ______________________________.

Assignment Sheet 1

Case A continued

7. Draw a usable Mayo setup of the instruments used for this myringotomy procedure. Instruments may be drawn or their names may be written in the appropriate places.

Case B: You are assigned to set up and pass on a septoplasty on a 30-year-old male under local anesthesia for correction of a deviated septum.

1. List two medications that may be used for anesthesia.

   Note: These are usually set up on a separate Mayo for local injection.

   a. ______________________________

   b. ______________________________

2. To open the nostril for swallowing and injection of local anesthesia, a/an ________________ is used.

3. The septum is pulled downward and an incision is made with a knife of the surgeon's preference and fine scissors. ________________ ________________ are used to retract wound edges.

4. The tissue around the septum (mucoperichondrium) is elevated with a/an ________________.

5. A/an ________________ is used to grasp and remove the septum.

Assignment Sheet 1

Case B continued

6. The cartilage is placed into a small basin with ____________________.

7. Bleeding is controlled and the nasal cartilage is reshaped. The surgeon may need ____________________ and ____________________ to reshape the cartilage.

8. Nasal bone may need trimming prior to reinsertion of the septum. To grasp the septum, the surgeon may use thumb forceps such as bayonets or a/an ____________________ which may also be used to position plastic splints or nasal packing.

9. Draw a usable Mayo below for this procedure. Instruments may be drawn or their names written in.

Assignment Sheet 1

Case C: You are to set up a tonsillectomy and adenoidectomy for a 5-year-old female. Refer to this unit's information sheets for a listing of the instruments to be used and their correct order.

1. The procedure is as follows:

   * Patient is positioned.

   a. __________________ is inserted into the mouth.

   b. __________________ and __________________ are used to remove adenoid tissue.

   c. __________________ is used to grasp the tonsil.

   * The tonsil is incised with the surgeon's preferred tonsil knife.

   d. __________________ and __________________ are used to elevate and dissect free the tonsil.

   Note: A snare may be used to free the tonsil from its pillar attachment or laser method may be used instead.

   e. Bleeding is controlled by __________________, cautery, tonsil sponges, lasers, or suturing.

2. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Ophthalmic Surgery
Unit 8

Objective Sheet

Unit Objective

After completing this unit, the student should be able to discuss extraocular procedures, intraocular procedures, and special considerations for ophthalmic surgery. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to ophthalmic surgery with their correct definitions.
2. State the purpose of ophthalmic surgery.
3. Select true statements concerning basic procedures to correct extraocular conditions.
4. Complete statements concerning procedures to correct intraocular conditions.
5. Match procedures for removal of the eye with the correct descriptions.
6. Select true statements concerning special considerations for ophthalmic surgery.
7. Match drugs for ophthalmic surgery with the correct uses.
8. Match specialized instruments for ophthalmic surgery with the correct uses.
9. Arrange in order the steps for an intracapsular cataract extraction.
10. Determine needs for given ophthalmic surgery cases. (Assignment Sheet 1)

Ophthalmic Surgery
Unit 8

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—The Eye (Objective 1)
   TM 2—The Eye and Accessory Structures (Objective 1)
   TM 3—Lacrimal Gland (Objective 1)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. These could be used as a homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Suggested Activities

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet rating and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to ophthalmic surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for ophthalmic surgery. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in ophthalmic surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in ophthalmic surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used by this specialty. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in ophthalmic surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about ophthalmic surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in this surgical specialty area. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

Suggested Activities

9. Divide students into groups, and assign each group a different procedure commonly performed in ophthalmic surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic setups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

10. Show videos of procedures common to ophthalmic surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

12. Use drug cards to review common ophthalmic drugs. Discuss uses and side effects. Teacher Supplement 1 is included as an optional activity for students if you choose to have them research ophthalmic drugs. **Foundation skills, influence skills**

13. You may wish to divide the class into teams and have each team take a different case study in Assignment Sheet 1. Have groups present written and/or oral presentations over their cases. **Foundation skills, communication skills, group effectiveness skills**

Resources Used in Developing This Unit

1. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C.V. Mosby Co., 1992.

2. *Core Curriculum for Surgical Technology*. Littleton, CO: Association of Surgical Technologists, 1990.

3. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

4. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

Suggested Activities

5. *Taber's Cyclopedic Medical Dictionary*. Revised and edited by Clayton L. Thomas. 18th ed. Philadelphia: F. A. Davis Co., 1993.

6. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Supplemental Resources

1. *Eye Surgery Perioperative Nursing Practice*, DG-1439, 1983. 17-minute film. Focuses on cataract surgery with intraocular lens implantation and strabismus surgery.

2. *A Laser Safe Environment*, DG-1558, 1987. 16-minute film. Covers CO_2, argon, and Nd:YAG lasers and the necessary precautions needed to prevent injury to patient and staff.

   1 and 2 are available from:

   Cine-Med Distribution Center
   Davis + Geck Video Library
   P.O. Box 745
   Woodbury, CT 06898
   800-633-0004

3. *Lasers for Eyes*, #FM-2356. 26-minute video. Covers the use of laser surgery in cataracts, macular degeneration, glaucoma, retinal tears, and diabetic retinopathy.

4. *Eye Surgery With Lasers*, #FM-3177. 19-minute videotape. Explains the function of the eye, common eye conditions like myopia and hyperopia, use of laser to correct these conditions, pros and cons of PRK, and other uses of laser eye surgery.

   3 and 4 are available from:

   Films for the Humanities and Sciences
   Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

5. *The Ophthalmology Surgery Series*, 12 learning modules. Available from:

   Medcom/Trainex
   P. O. Box 3225
   Garden Grove, CA 92641
   800-877-1443 or 714-891-1443

Ophthalmic Surgery
Unit 8

Answers to Student Supplements

Student Supplement 1

a. Iris
b. Lens
c. Anterior chamber
d. Cornea
e. Posterior chamber
f. Vitreous body
g. Optic nerve
h. Retina
i. Choroid
j. Sclera
k. Trigeminal nerve
l. Oculomotor nerve
m. Superior rectus muscle
n. Ophthalmic nerve
o. Lower eyelid
p. Inferior rectus muscle

Student Supplement 2

1.	b	11.	d
2.	c	12.	a
3.	c	13.	c
4.	b	14.	c
5.	a	15.	a
6.	d	16.	b
7.	d	17.	b
8.	a	18.	c
9.	c	19.	d
10.	d	20.	d

Ophthalmic Surgery
Unit 8

Answers to Assignment Sheet 1

Case A: 3-year-old male; to strengthen right rectus

1. Strabismus
2. Extraocular
3. Resection (of the right rectus muscle)
4. General (due to patient's age and type of procedure)
5. Any three of the following: Muscle hook, calipers, Castroviejo or similar needleholders, scissors—iris or tenotomy (to be evaluated by instructor)
6. Because of patient's age keep environment quiet, use simple explanations, and warm up room.

Case B: 23-year-old female; corneal scarring/infection

1. Keratoplasty — Corneal transplant
2. Corneal forceps and needleholder (most likely—others to be evaluated by instructor)
3. Antibiotics and anti-inflammatories (to be evaluated by instructor)
4. Depends upon having cadaver tissue available for transplant

Case C: 80-year-old female; cataracts

1. A lens that has become opaque
2. Any two of the following: Intracapsular extraction, linear extraction, extracapsular extraction, and phacoemulsification (PEK)
3. O.D.
4. Any three of the following: Local anesthesia, antibiotics, alpha-chymotripsin, anti-inflammatory, miotics, hyaluronidase, mydriatics, irrigants, and vasoconstrictors
5. Topical, local-nerve block and IV sedation
6. Special considerations to be evaluated by instructor may include: Room conditions should be quiet. Movement and noise could cause the patient to move. Also other factors related to the patient's age.

Case D: 60-year-old male; glaucoma

1. Eye disease with increased intraocular pressure
2. Atrophy of optic nerve, hardening of the eyeball, and blindness
3. Any two of the following: iridectomy, filtering procedures (such as trephining and trabeculectomy), scleral flap procedures, cyclodialysis, and goniotomy
4. Miotics
5. Cyclodialysis spatula

Ophthalmic Surgery
Unit 8

Answers to Written Test

1.	a.	19	h.	30	o.	7
	b.	17	i.	23	p.	29
	c.	9	j.	6	q.	20
	d.	14	k.	5	r.	4
	e.	21	l.	22	s.	8
	f.	25	m.	1	t.	11
	g.	18	n.	12	u.	27

2. To preserve or restore a patient's optimal vision which may be threatened by congenital defects, injury, or disease

3.	a.	T	e.	T	i.	T
	b.	F	f.	F	j.	F
	c.	T	g.	F	k.	F
	d.	T	h.	T		
4.	a.	4	d.	3	g.	2
	b.	3	e.	2	h.	1
	c.	3	f.	3		
5.	a.	1				
	b.	3				
	c.	2				
6.	a.	F	f.	F	k.	F
	b.	F	g.	T	l.	F
	c.	T	h.	F	m.	F
	d.	T	i.	F		
	e.	T	j.	T		
7.	a.	9	d.	2	g.	5
	b.	4	e.	7	h.	6
	c.	8	f.	10	i.	1
8.	a.	6	e.	11	i.	14
	b.	12	f.	2	j.	3
	c.	7	g.	13		
	d.	4	h.	5		
9.	a.	10	f.	4	k.	5
	b.	6	g.	2	l.	14
	c.	7	h.	15	m.	12
	d.	13	i.	1	n.	9
	e.	11	j.	3	o.	8

Ophthalmic Surgery
Unit 8

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

______a. System that secretes and conducts tears

______b. Muscles located inside the eyeball itself; includes the iris and ciliary body

______c. That part of the eye which in addition to the cornea refracts light rays and focuses them on the retina

______d. Eyeball

______e. Light rays come to a focus in front of the retina; nearsightedness

______f. Innermost, incomplete coat of the eyeball that receives images formed by the lens

______g. Colored membrane of the eye which separates the anterior and posterior chambers; contracts and dilates to regulate entrance of light rays

______h. Ligaments radiating from the ciliary body to the lens, holding the lens in place

______i. Space between lids and lens which is filled with aqueous humor

______j. Mucous membrane which lines the eyelids and covers the anterior surface of the globe

1. Abrasion
2. Amblyopia
3. Anterior chamber
4. Aqueous humor
5. Bony orbit
6. Conjunctiva
7. Canthus
8. Cornea
9. Crystalline lens
10. Exophthalmos
11. Extraocular
12. Extrinsic eye muscles
13. Glaucoma
14. Globe
15. Hyperopia
16. Intraocular
17. Intrinsic eye muscles

Written Test

______k. Rounded socket in the cranium in which the eyeball is partially sunk

______l. Second cranial nerve with special sense of sight which transmits impulses to the occipital region of the brain concerned with vision

______m. Scraping injury in which skin or membrane is denuded

______n. Muscles connecting the eyeball to the orbital cavity

______o. Inner or outer corner or angle where the eyelids meet

______p. Clear, jelly-like fluid in the posterior cavity of the eye which fills the vitreous body

______q. Edge of the cornea where it unites with the sclera

______r. Water, transparent liquid that circulates through the anterior cavity of the eye

______s. Transparent portion of the outer layer of the eyeball

______t. Outside the globe of the eye

______u. Rods and cones in the retinal layer which are stimulated by light rays to conduct nerve impulses to the brain via the optic nerve

18. Iris
19. Lacrimal glands and ducts
20. Limbus
21. Myopia
22. Optic nerve
23. Posterior chamber
24. Pupil
25. Retina
26. Sclera
27. Sensory receptors
28. Tarsal plate
29. Vitreous humor
30. Zonules

2. State the purpose of ophthalmic surgery.

____

____

____

Written Test

3. Select true statements concerning basic procedures to correct extraocular conditions by placing a "T" or "F" next to the true or false statements.

______a. To repair lacerations of the eyelids anatomical layers must be approximated and stents may be needed if the lacrimal ducts are involved.

______b. Neoplasms are usually cancerous basal cells and may be removed with cryosurgery, knife, or curettes.

______c. Two conditions which may require repair are ptosis and ectropion.

______d. Dacryocystectomy is the removal of a lacrimal sac for acute or chronic dacryocystitis.

______e. Dacryocystostomy is the incision and drainage of the lacrimal duct for acute dacryocystitis.

______f. Dacryocystorhinostomy is the removal of the lacrimal sac and insertion of a stent in the lacrimal duct.

______g. Resection is the cutting and reattachment of a muscle beyond the point of original insertion.

______h. Recession is the cutting of a muscle with reattachment more posteriorly.

______i. Tucking a muscle is a method of shortening it.

______j. Myectomy is a method of strengthening a muscle.

______k. Decompression and removal of orbital tumors are simple procedures to correct orbital defects.

4. Complete the following statements concerning procedures to correct intraocular conditions by placing the correct answers in the blanks provided.

______a. Corneal transplant is the partial or full-thickness grafting of corneal tissue for which of the following reasons:

(1) Vitreal hemorrhage
(2) Retinal detachment
(3) Pterygium
(4) Corneal opacity

Written Test

______b. Refractive keratoplasties such as radial keratotomy are designed to flatten the cornea and improve vision for ____________ patients.

(1) Amblyopic
(2) Astigmatic
(3) Myopic
(4) Hyperopic

______c. All of the following are procedures for glaucoma **EXCEPT**

(1) Cyclodialysis
(2) Iridectomy
(3) Vitrectomy
(4) Trephination

______d. Procedures for the treatment of glaucoma are aimed at

(1) Increasing intraocular pressure
(2) Increasing extraocular pressure
(3) Reducing intraocular pressure
(4) Reducing extraocular pressure

______e. A partial or full-thickness grafting of corneal tissue from one human cadaver eye to another human is a/an

(1) Iridectomy
(2) Keratoplasty
(3) Vectrectomy
(4) Cyclodoplasty

______f. Diathermy, cryosurgery, and scleral bucking may all be used to repair ____________

(1) Torn eye muscles
(2) Corneal scarring
(3) Detached retina
(4) Astigmatism

______g. The type of laser most commonly used for procedures involving the retina is the ____________ laser.

(1) Xenon
(2) Argon
(3) Neon
(4) CO_2

Written Test

______h. The method for removing a cataract by breaking it up and aspirating it with ultrasonic vibrations is:

(1) Phacoemulsification
(2) Laser surgery
(3) Extracapsular extraction
(4) Intracapsular extraction

5. Match procedures for removal of the eye on the right with the correct descriptions.

______a. Removal of the entire eyeball for malignant tumors of the eyeball, trauma, or blind, painful glaucoma and hopeless infections

______b. Removal of all of the contents of the orbit for advanced tumors which are usually malignant or tumors of the lids or the eyeball that have extended into the orbit

______c. Removal of the contents of the eye, leaving the sclera intact and the muscles attached to the sclera to reduce the danger of transmission of intraocular infection to the orbit and brain, and to provide points for attachment of a prosthesis

1. Enucleation

2. Evisceration

3. Exenteration

6. Select true statements concerning special considerations for ophthalmic surgery by placing a "T" or "F" next to the true or false statements.

______a. The operating microscope is rarely used during ophthalmic procedures.

______b. Sutures for ophthalmic surgery are available in a wide range of materials in sizes from 12-0 to 17-0.

______c. Eye sutures must be handled very carefully and as little as possible.

______d. Single-arm and double-arm suture-needle combinations are available and are used according to the surgeon's preference.

______e. All materials such as sponges and drapes must be lint-free.

______f. Ophthalmic sponges are precut, compressed cotton patties with strings attached.

Written Test

______g. The ophthalmic cautery unit may be a hand-held, single-use item.

______h. General anesthesia is used for most ophthalmic surgery.

______i. The surgeon may administer a spinal block to keep the eye absolutely still (as well as to raise intraocular pressure).

______j. Since almost all ophthalmic solutions are colorless and may be in similar receptacles, solutions must be immediately and individually labeled to totally avoid any confusion of identity.

______k. Sterile cloth drapes are often placed over plastic drapes to prevent lint.

______l. Eye abbreviations commonly used include the following:

(1) O.R. — right eye
(2) O.L. — left eye
(3) O.B. — both eyes

______m. During preps, eyebrows are routinely trimmed or shaved.

7. Match drugs for ophthalmic surgery on the right with the correct uses.

______a. Used to dilate the pupil; examples include Neo-Synephrine®, Cyclogyl®, and atropine sulfate

______b. Used to reduce inflammation and prevent edema; examples include Depo-Medrol®, Decadron®, and Celestone®

______c. Use to constrict the pupil to reduce intraocular pressure; also used to help prevent loss of vitreous humor in cataract surgery; examples include Isopto Eserine® and Miochol®

______d. Used locally or topically to produce the absence of all sensation; examples include Xylocaine®, Novocain®, and Ophthaine®

1. Alpha-chymotrypsin
2. Anesthetics
3. Antibiotics
4. Anti-inflammatory agents
5. Fluorescein sodium
6. Hyaluronidase
7. Irrigants
8. Miotics
9. Mydriatics/cycloplegics
10. Vasoconstrictors

Written Test

______e. Used to irrigate anterior chamber, to keep cornea and eye tissue moist, and to soak and rinse intraocular lenses; examples include balanced salt solution and lactated Ringer's solution

______f. Used to prolong duration of local anesthetic and to decrease bleeding; examples include epinephrine 1:1000, epinephrine 1:50,000-1:200,000, and cocaine 4%-10%

______g. Used to stain the cornea for detecting corneal abrasions and foreign bodies

______h. Used as an adjunct to increase absorption and dispersion of the anesthetic agent; example is Wydase®

______i. Used during cataract surgery to dissolve the zonules that attach to the lens of the eye; examples include Zolyse®, Zonulyn®, and Alpha Chymar®

8. Match the specialized instruments for ophthalmic surgery on the right with the correct uses.

______a. Used to grasp delicate eye tissue

______b. Used to mark incisions, optic zones, astigmatism, radial, or corneal lines

______c. Used to retract and manipulate the iris on intraocular procedures such as cataract extraction

______d. Used to create a tract between anterior chamber and suprachoroidal space to allow for the escape of aqueous humor and reduce intraocular pressure in glaucoma

______e. Used to position the lens in cataract extraction with intraocular lens implant

1. Air injection cannula
2. Caliper
3. Corneal scissors
4. Cyclodialysis spatula
5. Eye speculum
6. Forceps, specialized
7. Iris hook
8. Iris scissors

Written Test

______f. Used for making precision measurements on such procedures as corneal, muscle, or eye lid surgeries

______g. Used to retract extrinsic eye muscles (rectus and oblique) in procedures to correct strabismus; also used on enucleation

______h. Used to retract open the eyelids for intraocular procedures such as cataract extraction

______i. Used to suture delicate eye tissues

______j. Used to cut the cornea for intraocular procedures

9. Irrigating and cyclodialysis cannula
10. Lacrimal probe
11. Lens loop
12. Markers
13. Muscle hook
14. Needleholder
15. Tenotomy scissors

9. Arrange in order the procedure for an intracapsular cataract extraction by placing the correct sequence numbers (1-15) in the appropriate blanks.

__*10*__ a. The anterior chamber is entered with a knife (or keratome) and corneal scissors.

______b. A transfixion suture (silk 4-0) is inserted under the tendon of the superior rectus muscle.

______c. A conjunctival flap is made with scissors.

__*13*__ d. The pupil is constricted with miotic drops.

______e. An iridectomy is performed, alpha-chymotrypsin is injected through the iridectomy.

______f. Patient is draped.

______g. Patient is positioned.

______h. Pilocarpine or atropine and antibiotics are applied topically.

______i. Anesthesia is administered.

______j. Face is prepped on affected side.

______k. An eye speculum is inserted to hold the lids apart.

Written Test

______ l. Sutures are tied.

______ m. The lens is grasped and extracted.

______ n. Limbus or corneal incision is made.

__8__ i. Bleeding points are coagulated by use of a bipolar unit.

*Permission to duplicate this test is granted.

Ophthalmic Surgery
Unit 8

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Ophthalmic Surgery Cases Rating _____

Comments: ____

____

Written Test Scores

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

*Permission to duplicate this form is granted.

Ophthalmic Surgery
Unit 8

Teacher Supplement 1—Research the Uses and Side Effects of Ophthalmic Drugs (Optional Assignment)

Name ____________________ Date ____________

Directions: Using the unit information sheets and references such as the *Physicians Desk Reference* or other references provided by your instructor, select a drug for each category and provide the requested information.

A. Ophthalmic anesthetic used as a local

Name of drug: ____________________

Usual dosage: ____________________

What it is used for: ____________________

Side effects: ____________________

____

____

B. Anti-inflammatory agent

Name of drug: ____________________

Usual dosage: ____________________

What it is used for: ____________________

Side effects: ____________________

____

____

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Teacher Supplement 1

C. Miotic

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

D. Antibiotic

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

E. Mydriatic/cycloplegic

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

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Teacher Supplement 1

F. Irrigant

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

G. Vasoconstrictor

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

H. Drug used to dissolve the zonules that hold the lens in place

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

Teacher Supplement 1

I. Drug used to detect corneal abrasions

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

Side effects: ______________________________

____

____

J. Drug used with locals to increase the absorption of the local

Name of drug: ______________________________

Usual dosage: ______________________________

What it is used for: ______________________________

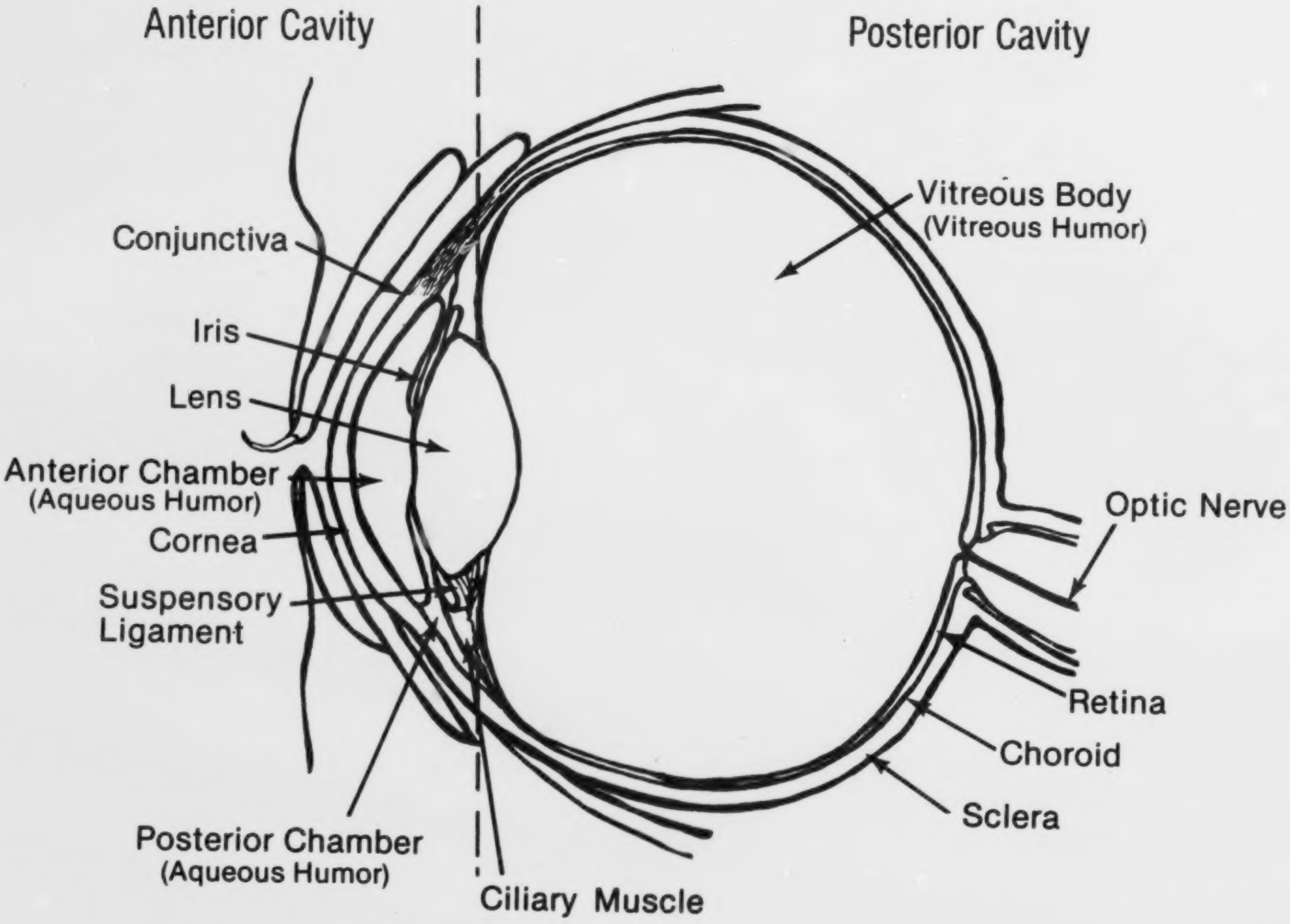
Side effects: ______________________________

____

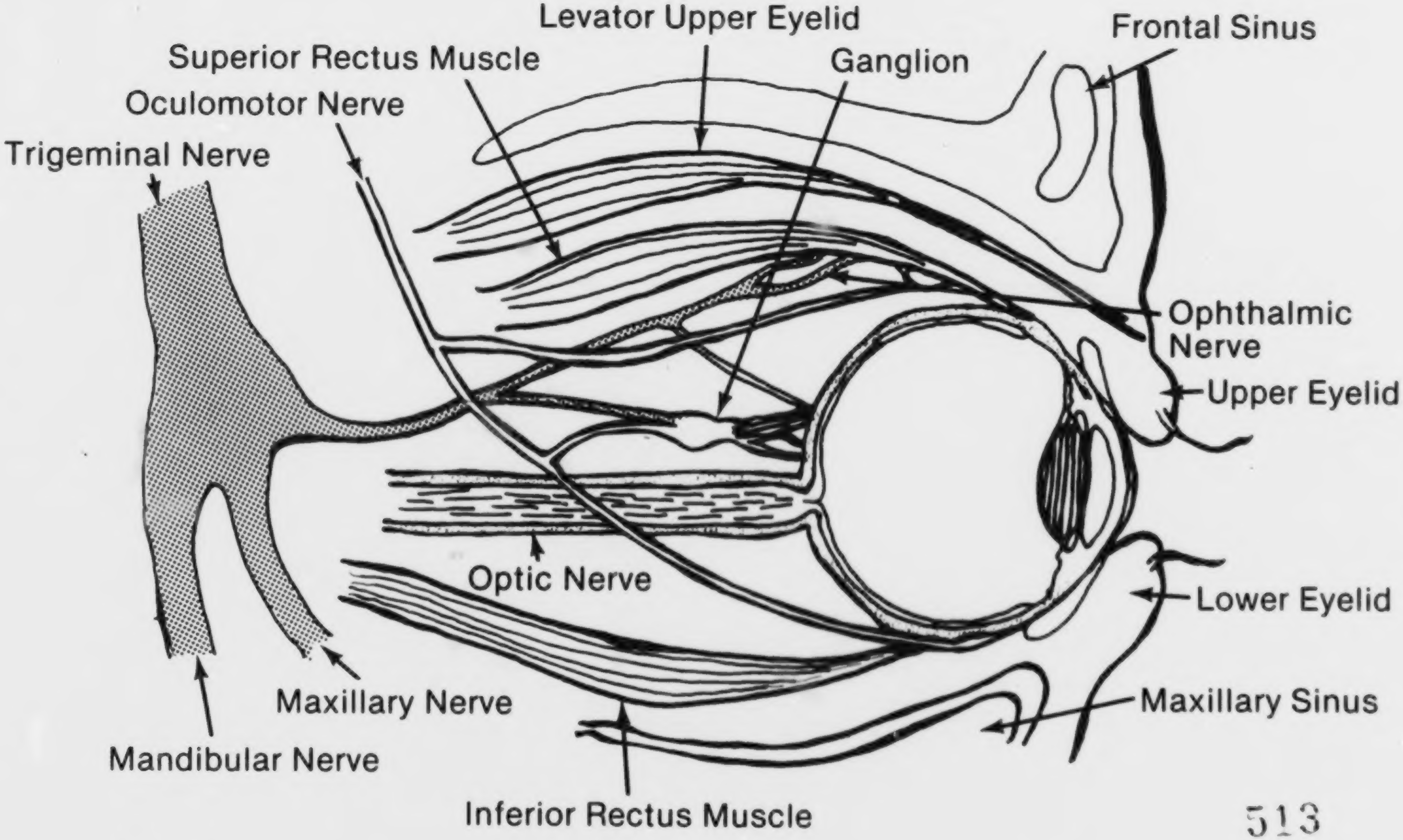
____

***Permission to duplicate this form is granted.**

The Eye


Anterior Cavity
Posterior Cavity
Vitreous Body
(Vitreous Humor)
Conjunctiva
Iris
Lens
Anterior Chamber
(Aqueous Humor)
Cornea
Suspensory
Ligament
Optic Nerve
Retina
Choroid
Sclera
Posterior Chamber
(Aqueous Humor)
Ciliary Muscle

The Eye and Accessory Structures


Levator Upper Eyelid
Frontal Sinus
Superior Rectus Muscle
Ganglion
Oculomotor Nerve
Trigeminal Nerve
Ophthalmic Nerve
Upper Eyelid
Optic Nerve
Lower Eyelid
Maxillary Sinus
Maxillary Nerve
Mandibular Nerve
Inferior Rectus Muscle

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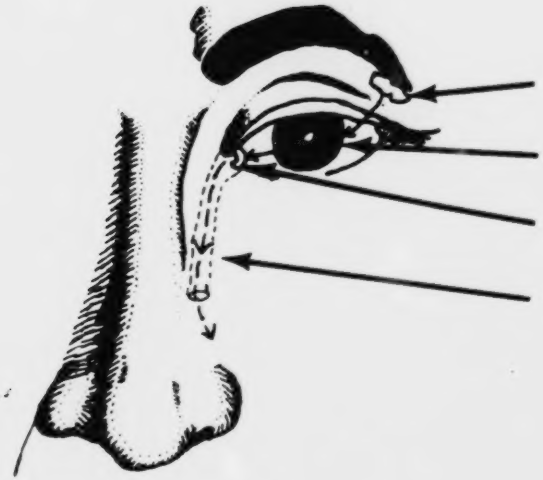
Lacrimal Gland



1. Lacrimal gland releases tears.
2. Tears wash over eyeball.
3. Tears leave eye via lacrimal duct.
4. Tears wash down into nasolacrimal duct.

Surgical Procedures, Unit 8
Teacher Page 33

TM 3

Ophthalmic Surgery
Unit 8

Information Sheet

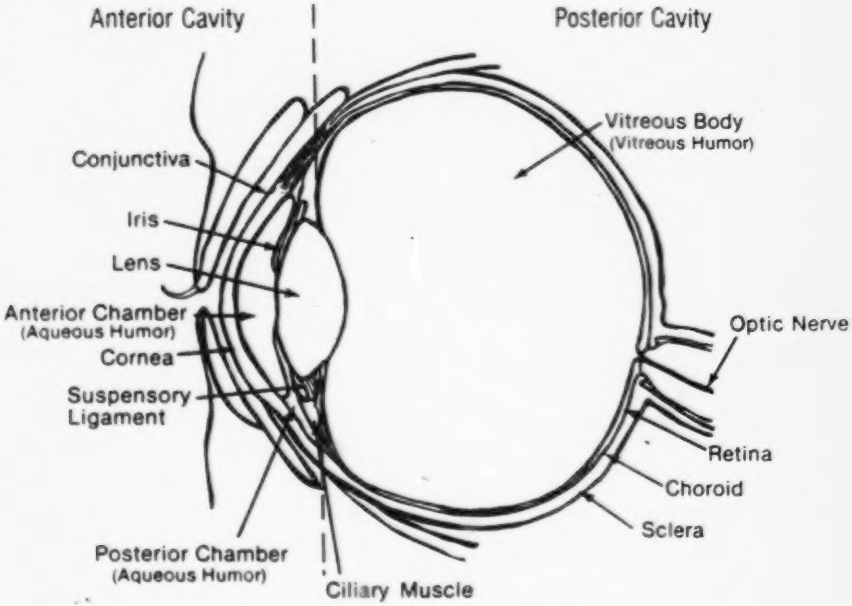
1. **Terms and definitions**

    a. **Abrasion** — Scraping injury in which skin or membrane is denuded

    b. **Amblyopia** — Reduced or dimness of vision, not dependent upon visible changes in the eye and not a refractive error

    c. **Anterior chamber** — Frontal space in the eyeball; bounded by cornea, iris, and lens

Figure 1—The eye


Anterior Cavity
Posterior Cavity
Vitreous Body
(Vitreous Humor)
Conjunctiva
Iris
Lens
Anterior Chamber
(Aqueous Humor)
Cornea
Suspensory
Ligament
Optic Nerve
Retina
Choroid
Sclera
Posterior Chamber
(Aqueous Humor)
Ciliary Muscle

    d. **Aqueous humor** — Watery, transparent liquid that circulates through the anterior cavity (anterior and posterior chambers) of the eye

    e. **Bony orbit** — Rounded socket in the cranium in which the eyeball is partially sunk

    f. **Conjunctiva** — Mucous membrane which lines the eyelids and covers the anterior surface of the globe

    g. **Canthus** — Inner or outer corner or angle where the eyelids meet

Information Sheet

h. **Cornea** — Transparent portion of the outer layer (sclera) of the eyeball

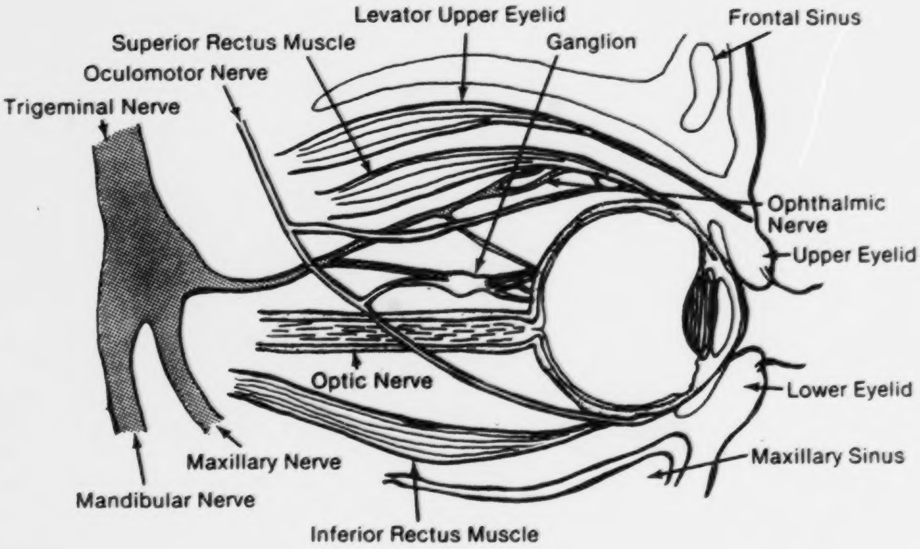
i. **Crystalline lens** — That part of the eye which in addition to the cornea refracts light rays and focuses them on the retina

j. **Exophthalmos** — Abnormal protrusion of the eyeball from the bony orbit due to abnormal thyroid condition or orbital tumor

k. **Extraocular** — Outside the globe of the eye

l. **Extrinsic eye muscles** — Muscles connecting the eyeball to the orbital cavity

Figure 2—The eye and accessory structures


Levator Upper Eyelid
Frontal Sinus
Superior Rectus Muscle
Ganglion
Oculomotor Nerve
Trigeminal Nerve
Ophthalmic Nerve
Upper Eyelid
Optic Nerve
Lower Eyelid
Maxillary Nerve
Maxillary Sinus
Mandibular Nerve
Inferior Rectus Muscle

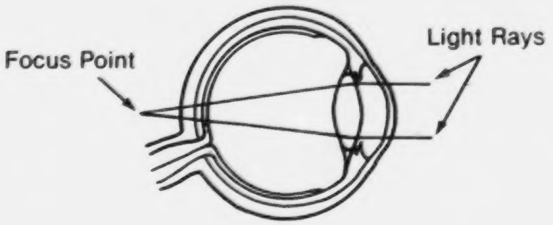
m. **Glaucoma** — Eye disease characterized by increase in intraocular pressure, which results in atrophy of optic nerve and blindness

n. **Globe** — Eyeball

Information Sheet

o. **Hyperopia** — Light rays come to a focus behind the retina; farsightedness

Figure 3—Hyperopia


Focus Point
Light Rays

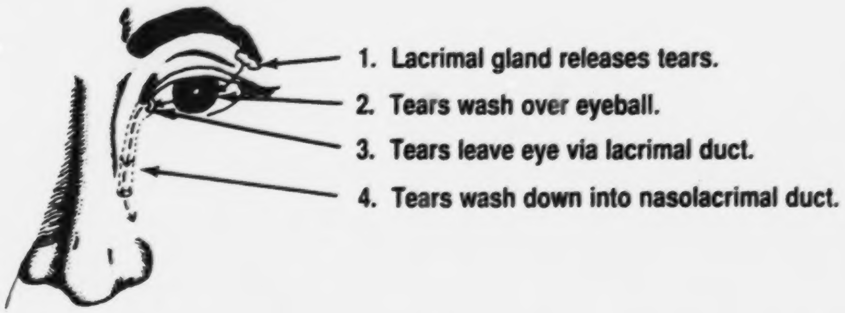
p. **Intraocular** — Inside the globe of the eye

q. **Intrinsic eye muscles** — Muscles located inside the eyeball itself; includes the iris and ciliary body

r. **Iris** — Colored membrane of the eye which separates the anterior and posterior chambers; contracts and dilates to regulate entrance of light rays

s. **Lacrimal glands and ducts** — System that secretes and conducts tears

Figure 4—Lacrimal gland

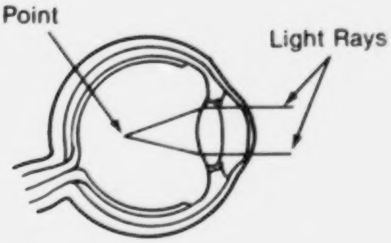

1. Lacrimal gland releases tears.
2. Tears wash over eyeball.
3. Tears leave eye via lacrimal duct.
4. Tears wash down into nasolacrimal duct.

t. **Limbus** — Edge of the cornea where it unites with the sclera

Information Sheet

u. **Myopia** — Light rays come to a focus in front of the retina; nearsightedness

Figure 5—Myopia



v. **Optic nerve** — Second cranial nerve with special sense of sight which transmits impulses to the occipital region of the brain concerned with vision

w. **Posterior chamber** — Space between lids and lens which is filled with aqueous humor

x. **Pupil** — Opening at the center of the iris

y. **Retina** — Innermost, incomplete coat of the eyeball that receives images formed by the lens

z. **Sclera** — Outer coat of the eye made up of a transparent portion (cornea) and a white portion

aa. **Sensory receptors** — Rods and cones in the retinal layer which are stimulated by light rays to conduct nerve impulses to the brain via the optic nerve

bb. **Tarsal plate** — Any one of the plates of cartilage forming the upper and lower eyelids

cc. **Vitreous humor** — Clear, jelly-like fluid in the posterior cavity of the eye which fills the vitreous body

dd. **Zonules** — Ligaments radiating from the ciliary body to the lens, holding the lens in place

2. **Purpose of ophthalmic surgery**—To preserve or restore a patient's optimal vision which may be endangered by congenital defects, injury, or disease

Information Sheet

3. Basic procedures to correct extraocular conditions

a. **Procedures involving the eyelid(s)**

(1) **Repair of lacerations** — Anatomical layers must be approximated; may involve the lacrimal glands or ducts and require the use of stents

(2) **Biopsy or excision of neoplasms** — Removal by use of a knife, cautery, cryosurgery, and/or curettes; most are benign

Note: A chalazion is the most common benign eyelid tumor. Basal cell carcinomas account for over 90% of the cancerous tumors.

(3) **Repair of structural defects** — May be congenital or occur with aging or chronic inflammation

(a) **Repair of ptosis or blepharochalasis** (drooping upper lid/s)

(b) **Repair of entropion** (turning inward of the lid) or **ectropion** (sagging and eversion of the lower lid)

Note: Repairs of these conditions may involve muscles as well as soft tissue. There are several different methods of repair.

b. **Correction of pterygium** — Separation of thickened conjunctiva from the cornea by scraping or excising

c. **Procedures involving the lacrimal apparatus**

(1) **Dacryocystectomy** — Removal of a lacrimal sac for acute inflammation or chronic dacryocystitis

(2) **Dacryocystostomy** — Incision and drainage of the lacrimal duct for acute dacryocystitis

(3) **Dacryocystorhinostomy** — Forming a communication between the lacrimal sac and the middle meatus of the nose through the lacrimal bone to establish a new tear passageway for drainage directly into the nasal cavity or for chronic dacryocystitis

d. **Procedures involving the extraocular muscles**

(1) **Resection** — Portion of the muscle is excised and the severed end is attached at the point of original insertion; used to strengthen a rectus muscle

Information Sheet

(2) **Recession** — Cutting a muscle from its original insertion and reattaching it more posteriorly; used to weaken an overactive rectus muscle

(3) **Tuck** — Method of shortening a muscle by taking a tuck and suturing it down; performed primarily on the superior oblique muscle

(4) **Myectomy** — Method of weakening the action of a muscle by making cuts into the muscle approximately three fourths of the width of the muscle; several methods may be used; generally used on oblique muscles

e. **Orbital procedures** — Complex procedures involving the bony orbit or the entire eye

(1) **Decompression** — For treatment of severe exophthalmos that does not respond to conventional medical treatment

(2) **Removal of orbital tumors** — Location of the tumor determines the incisional approach.

Note: These procedures may involve an interdisciplinary team of surgeons.

4. **Basic procedures to correct intraocular conditions**

a. **Procedures on the cornea**

(1) **Corneal transplant (also known as keratoplasty)** — Partial or full-thickness grafting of corneal tissue from one human cadaver eye to another human for the following conditions:

(a) **Corneal opacity** (when the rest of the eye and optic nerve are normal)

(b) **Keratoconus** (conical protrusion of the central part of the cornea, resulting in an irregular astigmatism)

(c) **Corneal scarring**

(d) **Corneal thickening**

Note: Damage to the cornea can interfere with visual acuity.

Information Sheet

(2) **Refractive keratoplasty (cornea reshaping)** — Group of procedures used to reshape and alter the focusing power of the cornea

(a) **Radial keratotomy** — Series of spoke-like superficial incisions from the edge of the cornea toward the center to flatten the cornea which reduces the refractive error and improves vision for myopic patients

(b) **Use of corneal tissue grafts** — Used to reshape cornea in order to correct aphakia (absence of lens) causing extreme hyperopia, myopia, and keratoconus

(3) **Other corneal procedures**

(a) **Repair of lacerations**

(b) **Removal of foreign bodies**

(c) **Cauterization** — Use of chemicals or heat for corneal ulceration

b. **Procedures on the iris**

Note: The majority of these procedures are aimed at reducing intraocular pressure resulting from glaucoma. If uncontrolled, glaucoma progresses to atrophy of the optic nerve, hardening of the eyeball, and blindness. Surgery is aimed at reducing tension in the eye by establishing drainage of the aqueous humor. This may be done by one of several methods.

(1) **Iridectomy** — Excision of a sector of iris to deflate the mechanical obstruction, thus increasing drainage by permitting normal outflow of aqueous humor from the posterior to the anterior chamber

Note: This procedure also makes an abnormally small pupil larger to improve vision. An iridectomy is also usually done at the time of a cataract extraction.

(2) **Filtering procedures** — Creation of an artificial fistula between the angle of the anterior chamber and the subconjunctival space to bypass blocked outflow channels; two common filtering procedures include trephination and trabeculectomy which are usually performed along with an iridectomy

(3) **Scleral flap procedures (anterior and posterior lid sclerectomies)** — Creation of a drainage channel to the subconjunctival space for treatment of chronic glaucoma

Information Sheet

(4) **Cyclodialysis** — Formation of a communication between the anterior chamber and the space located between the sclera and the choroid to reduce aqueous secretion and thus induce lower pressure

(5) **Goniotomy** — Opening of a congenital membrane from the iris surface to Schwalbe's Line, thus allowing aqueous humor to reach the trabecular meshwork in cases of congenital glaucoma

c. **Procedures involving the retina**

(1) **Repair of a detached retina** — Reattachment of the retina using one or more of the following methods to seal off retinal tears or holes and to drain any vitreous humor or blood that may have seeped between the retina and the choroid

(a) **Diathermy** — Use of high frequency current to generate heat for electrocoagulation, cauterization, or localized inflammation which acts to seal off the break

(b) **Cryosurgery** — Use of extreme cold on tissue to produce adhesions which seal off the break (much like diathermy)

(c) **Scleral buckling** — Implantation of a wedge of silicone or eye bank sclera epi- or intrasclerally and an encircling band of silicone may be used to keep constant external pressure on the buckle

(d) **Pneumoretinopexy** — Injection of air or slowly-absorbable inert gas (sulfahexafluoride-SF6) to flatten the retina to the choroid

(2) **Photocoagulation** — Use of intense heat from a xenon photocoagulator to create adhesions which seal breaks in the retina and to destroy proliferating blood vessels which are producing hemorrhage into the retina and/or vitreous humor

(3) **Laser surgery** — Use of radiation from an argon or krypton laser to create beneficial burning and the resulting adhesions to seal breaks in the retina, to destroy proliferating blood vessels which are producing hemorrhage into the retina and/or vitreous humor, and to treat other retinopathies

Note: The argon laser is common used to treat diabetic retinopathy.

Information Sheet

(4) **Laser therapy** — Use of the argon or Nd:YAG laser noninvasively for several procedures; if successful, they may eliminate the need for more invasive procedures.

(a) **Nd:YAG laser trabeculoplasty** — Placement of laser burns to cause the trabecular meshwork to create an open channel to increase aqueous outflow

(b) **Argon laser iridotomy** — Placement of laser burns in the peripheral iris to create an opening from the anterior to posterior chamber

(5) **Vitrectomy** — Deliberate removal of a portion of the vitreous humor (vitreous body) that fills the area between the lens and the retina for vitreal opacities, vitreal hemorrhages, or certain types of retinal detachments

(6) **Cyclocryotherapy** — Use of a retinal cryoprobe to freeze a portion of the ciliary body to decrease aqueous secretions

d. **Surgery of the lens**

(1) **Removal or extraction of a cataract** — Removal of the opaque lens of the eye using various methods as follows:

Note: Only one eye is operated on at a time. A short time later, the other eye is operated on if it is bilateral.

(a) **Intracapsular extraction** — Entire lens within its capsule is delivered through a moderately-sided incision made into the region of the limbus

(b) **Linear extraction** — Performed on young adults using a small incision made through the limbus; major portion of the anterior capsule is excised along with the soft cataractous lens

(c) **Extracapsular extraction** — Anterior portion of the capsule is ruptured and removed, and the lens cortex and nucleus are expressed from the eye, leaving the posterior capsule behind

(d) **Phacoemulsification (PEK)** — Phacoemulsifier breaks up and aspirates the cataract or lens with ultrasonic vibrations

Note: Once the opaque lens is removed, vision is restored by means of eyeglasses, a contact lens, or an intraocular lens.

Information Sheet

(2) **Implantation of intraocular lens (IOL)** — Implantation of artificial intraocular lens in almost the identical position of the original lens

Note: The implant is usually inserted through the same incision used to remove the cataractous lens, and is called a primary insertion. Some surgeons prefer to implant the lens at a later time as a secondary insertion.

5. **Basic procedures for removal of the eye**

   a. **Enucleation of the eye** — Removal of the entire eyeball for malignant tumors of the eyeball, trauma, or blind, painful glaucoma and hopeless infections

   b. **Exenteration of the eye** — Removal of all of the contents of the orbit for advanced tumors which are usually malignant or tumors of the lids or the eyeball that have extended into the orbit

   c. **Evisceration of the eye** — Removal of the contents of the eye, leaving the sclera intact and the muscles attached to the sclera to reduce the danger of transmission of intraocular infection to the orbit and brain, and to provide points for attachment of a prosthesis

   Note: This is performed only in eyes that have been lost by infection.

6. **Special considerations for ophthalmic surgery**

   a. The operating microscope is used during nearly every ophthalmic procedure.

   b. Sutures for ophthalmic surgery are available in a wide range of materials in sizes from 4-0 to 12-0.

   c. Eye sutures must be handled very carefully and as little as possible.

   d. Single-arm and double-arm suture-needle combinations are available and are used according to the surgeon's preference.

   e. All materials such as sponges and drapes must be lint-free.

   f. Ophthalmic sponges are precut, compressed cellulose on sticks.

   g. The ophthalmic cautery unit may be a hand-held, single-use item.

   h. Wet field (bipolar) coagulators are reusable.

   i. Ophthalmic instruments are very delicate and costly and must be handled with care.

Information Sheet

j. Local anesthesia is used for most ophthalmic surgery, except for children and selected patients who may be given general anesthesia.

k. Even when general anesthesia is used, the surgeon may also administer a retrobulbar block to keep the eye absolutely still (as well as to lower intraocular pressure)

l. Since almost all ophthalmic solutions are colorless and may be in similar receptacles, solutions must be immediately and individually labeled to totally avoid any confusion of identity.

Caution: Any error in usage could result in total blindness for the patient.

m. Eye abbreviations commonly used include:

   (1) O.D. — Oculus dexter; right eye

   (2) O.S. — Oculus sinister; left eye

   (3) O.U. — Oculi unitas; both eyes

n. Special prepping considerations

   (1) Eyebrows are never shaved or removed unless the surgeon deems this essential because eyebrows do not grow back completely.

   (2) Eyelashes are trimmed if ordered with fine scissors coated with sterile petrolatum to catch the lashes.

   (3) Eyelids and periorbital areas are cleansed with nonstaining antiseptic agent.

   (4) Conjunctival sac may be flushed with a nontoxic agent such as benzalkonium chloride or balanced salt solution.

   (5) Eyes are kept closed during the prep and may be protected with a piece of sterile plastic sheeting.

o. Special draping considerations

   (1) Even if the operation is unilateral, the surgeon may want the entire face exposed for comparison of skin lines.

Information Sheet

(2) A standard head drape or towel and medium sheet are placed under the patient's head, drawn up on each side of the face crisscrossing at the forehead or at the hairline, and fastened with a clip to expose the desired amount of face.

(3) Three towels are used to surround the operative site, usually followed by a fenestrated eye drape to expose one eye.

(4) The remainder of the table is covered with sheets as needed.

(5) Sterile plastic drapes are often placed over cloth drapes to prevent lint.

7. Special drugs for ophthalmic surgery and their uses

a. **Anesthetics** — Used to produce the absence of all sensation; used locally or topically

Examples: Xylocaine®, Novocain®, Ophthaine®, Pontocaine®

b. **Antibiotics** — Used to prevent or treat infection; may be injectable or topical; usually are topical drops or ointment

Examples: Garamycin Ophthalmic®, Neosporin®, Aerosporin®, Mycifradin®, Gantrisin®

c. **Anti-inflammatory agents** — Used to reduce inflammation and prevent edema; injected or used topically

Examples: Depo-Medrol®, Decadron®, Celestone®

Caution: Anti-inflammatory agents should never be given to a patient who has an active infection because it would lower the resistance of the eye to infection.

d. **Irrigants** — Used to irrigate anterior chamber, to keep cornea and eye tissue moist, and to soak and rinse intraocular lenses

Examples: Balanced salt solution (BSS, Tis-U-Sol) and lactated Ringer's solution

Information Sheet

e. **Miotics** — Use to constrict the pupil to reduce intraocular pressure; also used to help prevent loss of vitreous humor in cataract surgery; drop form

Examples: Isopto Eserine®, Miochol®, pilocarpines—Almocarpine®, Nova-Carpine®

Note: Miochol® is unstable in solution and should not be used after sitting for 15 minutes. Therefore, it should be prepared immediately before use.

f. **Mydriatics/cycloplegics** — Used to dilate the pupil; drop form

Examples: Neo-Synephrine®, Cyclogyl®, atropine sulfate, Mydrosin®

Caution: These agents increase intraocular pressure and are not given to patients with glaucoma because they already have increased IOP.

g. **Vasoconstrictors** — Used to prolong duration of local anesthetic and to decrease bleeding; injected or topical

Examples: Epinephrine 1:1000, epinephrine 1:50,000-1:200,000, and cocaine 4%-10%

Caution: Cocaine is never injected, and epinephrine at 1:1000 strength is never injected. Instead they are instilled topically. Epinephrine at the weaker strengths may be injected.

h. **Miscellaneous**

(1) **Alpha-chymotrypsin** — Used during cataract surgery to dissolve the zonules that attach to the lens of the eye; injected through the iris

Examples: Zolyse®, Zonulyn®, and Alpha Chymar®

(2) **Fluorescein sodium** — Used to stain the cornea for detecting corneal abrasions and foreign bodies; swabbed on surface of the eye

(3) **Hyaluronidase** — Used as an adjunct to increase absorption and dispersion of the anesthetic agent; injected

Example: Wydase®

Information Sheet

8. Basic specialized instruments for ophthalmic surgery

Note: Many other specialized instruments could be added to this list. Complete setup will also include basic general instruments.

a. **Air injection cannula** — Used to inject air under the intraocular lens to float it into place

b. **Caliper (Castroviejo, Jameson)** — Used for making precision measurements on such procedures as corneal, muscle, or eyelid surgeries

c. **Corneal scissors (Castroviejo)** — Used to cut the cornea for intraocular procedures

d. **Cyclodialysis spatula (Castroviejo, Elschnig)** — Used to create a tract between anterior chamber and suprachoroidal space to allow for the escape of aqueous humor and reduce intraocular pressure in glaucoma

e. **Eye speculum (Barraquer, Cook, Lancaster, McPherson)** — Used to retract open the eyelids for intraocular procedures such as cataract extraction

f. **Forceps, specialized (many types)** — Used to grasp delicate eye tissue; name of forceps typically indicates type of tissue to be grasped; these specialized forceps include:

    (1) Iris forceps (Gill)
    (2) Capsule forceps (Arruga)
    (3) Chalazion forceps (Desmarres, Hunt)
    (4) Corneal forceps (Anis, Pierse-Colibri, McPherson)
    (5) Jewelers forceps
    (6) Lens holding forceps (Blaydes, Shepard)
    (7) Superior rectus forceps (Nugent, Troutman)
    (8) Suturing forceps (Castroviejo)
    (9) Tissue forceps (Bishop-Harmon)
    (10) Tying forceps (Anis, Jaffe, McPherson, Tennant)

g. **Iris hook (Jaffe, Knolle, Tyrell)** — Used to retract and manipulate the iris on intraocular procedures such as cataract extraction

h. **Iris scissors (McPherson, Barraquer)** — Used to incise the iris in such procedures as cataract procedures and procedures to reduce intraocular pressure

i. **Irrigating and cyclodialysis cannula** — Used to irrigate eye tissues with saline solution

j. **Lacrimal probe (Bowman, Williams)** — Used to probe and dilate the nasolacrimal duct

Information Sheet

k. **Lens loop (Lewis, Kirby)** — Used to position the lens in cataract extraction with intraocular lens implant

l. **Markers (many types)** — Used to mark incisions, optic zones, astigmatism, radial, or corneal lines

Note: These are all individual instruments. An optic zone marker is used to mark optic zones, a radial marker is used to mark radial lines, etc.

m. **Muscle hook (Graefe, Jameson, Stevens)** — Used to retract extrinsic eye muscles (rectus and oblique) in procedures to correct strabismus; also used on enucleation

n. **Needleholder (Barraquer, Castroviejo, McPherson)** — Used to suture delicate eye tissues

o. **Tenotomy scissors (Stevens)** — Used to incise during muscle procedures and plastic procedures (such as procedures on eyelids) and extraocular procedures (such as muscle and lacrimal duct procedures)

9. **Cataract extraction (Intracapsular)**

a. Anesthesia is administered. Usually a combination of techniques is used—drops to dilate the pupils and reduce the size of the vitreous body and nerve block (retrobulbar block) with IV sedation.

b. Patient is positioned.

c. Face is prepped on affected side. Eyelashes may be trimmed.

d. Patient is draped.

e. An eye speculum is inserted to hold the lids apart.

f. A transfixion suture (silk 4-0) is inserted under the tendon of the superior rectus muscle.

g. A conjunctival flap is made with scissors.

Note: Some surgeons do not use a flap.

h. Bleeding points are coagulated by use of a bipolar unit.

i. Limbus or corneal incision is made.

j. The anterior chamber is entered with a knife (or keratome) and corneal scissors.

Information Sheet

k. An iridectomy is performed, and alpha-chymotrypsin is injected through the iridectomy.

Note: Phacoemusification may be carried out at this point.

l. The lens is grasped and extracted.

m. The pupil is constricted with miotic drops.

n. Sutures are tied.

o. Pilocarpine or atropine and antibiotics are applied topically.

Ophthalmic Surgery
Unit 8

Student Supplement 1—Review Anatomy of the Eye

Name ______________________________ Date ____________________

Directions: Identify the parts of the eye and its accessory structures in the following illustrations. Write the correct names in the blanks provided.

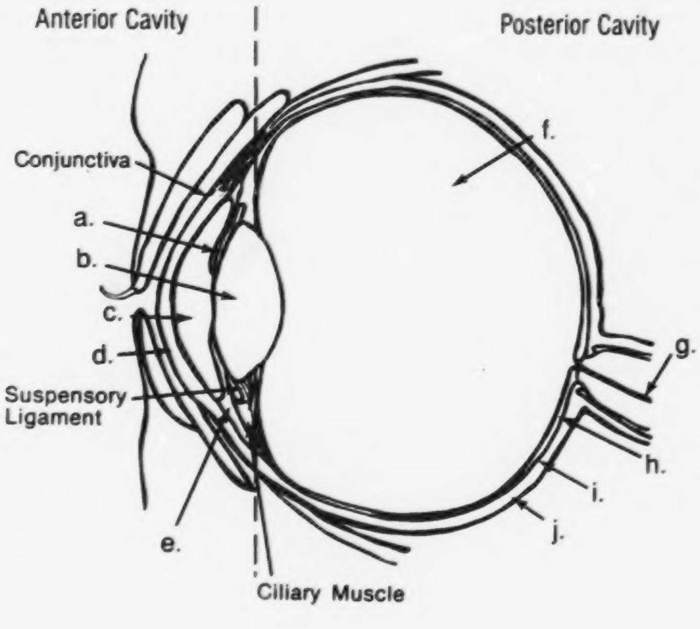
a. ____________________ f. ____________________

b. ____________________ g. ____________________

c. ____________________ h. ____________________

d. ____________________ i. ____________________

e. ____________________ j. ____________________


Anterior Cavity
Posterior Cavity
Conjunctiva
a.
b.
c.
d.
Suspensory Ligament
e.
Ciliary Muscle
f.
g.
h.
i.
j.

Student Supplement 1

k. ______________________________

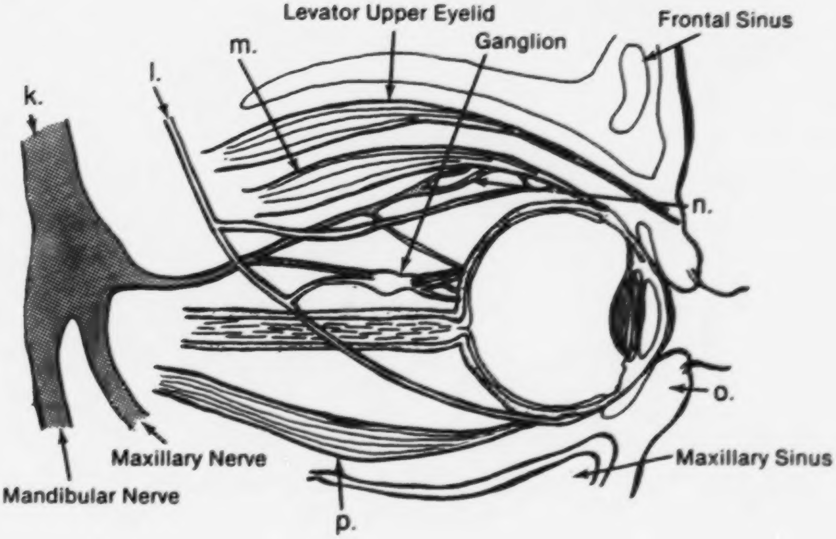
l. ______________________________

m. ______________________________

n. ______________________________

o. ______________________________

p. ______________________________


Levator Upper Eyelid
Frontal Sinus
Ganglion
m.
l.
k.
n.
o.
Maxillary Sinus
Maxillary Nerve
Mandibular Nerve
p.

Ophthalmic Surgery
Unit 8

Student Supplement 2—Review Concepts of Ophthalmic Surgery

Name ______________________________ Date ____________________

Directions: Select the best answer for each statement/question, and place your answers in the blanks provided.

______ 1. The mucous membrane which lines the eyelids and covers the anterior surface of the eye is:

a. Canthus
b. Conjunctiva
c. Cornea
d. Sclera

______ 2. A procedure used to strengthen a weak eye muscle by excising a portion of the muscle and reattaching the remainder is:

a. Myectomy
b. Recession
c. Resection
d. Tucking

______ 3. Which of the following statements about ophthalmic surgery is FALSE?

a. Microscopes are used on most procedures.
b. All drapes and sponges should be lint-free.
c. Suture sizes range from 0 to 20-0.
d. Local anesthesia is most commonly used.

______ 4. The structure of the eye that regulates the amount of light that enters the eye is:

a. Cornea
b. Iris
c. Lens
d. Retina

______ 5. The abbreviation for right eye is:

a. O.D.
b. O.R.
c. O.S.
d. O.U.

Student Supplement 2

______ 6. Which of the following procedures is NOT performed to correct glaucoma?

a. Cyclodialysis
b. Goniotomy
c. Iridectomy
d. Keratotomy

______ 7. A drug used to dilate the pupil is:

a. Alpha-chymotrypsin
b. Epinephrine
c. Miotic
d. Mydriatic

______ 8. The system that secretes and conducts tears is referred to as:

a. Lacrimal
b. Limbus
c. Meibomian
d. Zonule

______ 9. A drug used to constrict the pupil to reduce intraocular pressure is:

a. Atropine sulfate
b. Celestone®
c. Miochol®
d. Xylocaine®

______10. ____________ attach to the lens holding it in place and allowing for accommodation.

a. Canthus
b. Limbus
c. Retina
d. Zonules

______11. A triangular thickening of the bulbar conjunctiva onto the border of the cornea is referred to as:

a. Exophthalmos
b. Glaucoma
c. Hordeolum
d. Pterygium

Student Supplement 2

______12. The most common benign eyelid tumor is:

a. Chalazion
b. Hordeolum
c. Pterygium
d. Sty

______13. The condition where light rays come into focus behind the retina is:

a. Amblyopia
b. Diplopia
c. Hyperopia
d. Myopia

______14. The procedure for creating a new passageway for tears between the lacrimal sac and the nasal cavity is:

a. Dacryocystectomy
b. Dacryocystoplasty
c. Dacryocystorhinostomy
d. Dacryocystostomy

______15. Eye muscles that connect the eyeball to the orbital cavity are the ____________ muscles.

a. Extrinsic
b. Intrinsic
c. Orbital
d. Extraorbital

______16. What drug is used to dissolve the zonules?

a. Aerosporin®
b. Alpha-chymotrypsin
c. Fluorescein
d. Hyaluronidase

______17. Which instrument would best be used to create a tract between the anterior chamber and the suprachoroidal space to allow for the escape of aqueous humor and reduce intraocular pressure in glaucoma?

a. Castroviejo caliper
b. Cyclodialysis spatula
c. Iris forceps
d. Lens loop

Student Supplement 2

______18. A procedure usually also performed with a cataract extraction or trabeculectomy is:

a. Cryosurgery
b. Diathermy
c. Iridectomy
d. Vitrectomy

______19. The coat of the eye that is tough and continuous with the cornea is:

a. Choroid
b. Limbus
c. Retina
d. Sclera

______20. Which of the following statements is FALSE regarding irrigants?

a. Examples include balanced salt solution and Lactated Ringer's solution
b. Are used to keep the cornea and other eye tissues moist
c. Are used to rinse the intraocular lens
d. Are used to replace the vitreous humor

Ophthalmic Surgery
Unit 8

Assignment Sheet 1—Determine Needs for Given Ophthalmic Surgery Cases

Name ________________________ Overall rating __________

Evaluation criteria	**Rating**
Answers are appropriate	_____
Words are spelled correctly	_____

Directions: Read each of the following cases, and fill in the blanks with the appropriate information required. Refer to the information sheets as needed.

Case A: A 3-year-old male is scheduled to have surgery to strengthen his right rectus eye muscle.

1. The diagnosis is ________________________
2. Is this procedure considered extra- or intra-ocular? ________________________
3. The name of the procedure is ________________________
4. The type of anesthesia most likely to be used is ________________________
5. List three instruments that will most likely be used.
   a. ________________________
   b. ________________________
   c. ________________________
6. Describe any special considerations involving care of this patient.

____

____

Assignment Sheet 1

Case B: A 23-year-old female has corneal scarring due to a severe eye infection in her left eye which has left her legally blind.

1. What is the procedure of choice for this condition? ______________________________

2. List two instruments that would probably be used in this procedure.

   a. ____

   b. ____

3. List two possible types of drugs that could be used in this procedure.

   a. ____

   b. ____

4. Describe one unique feature of this procedure. ______________________________

   ____

Case C: An 80-year-old female who has cataracts is scheduled to have a right cataract extraction.

1. What is a "cataract"? ______________________________________

2. List two possible methods for performing this procedure.

   a. ____

   b. ____

3. What abbreviation would be used to indicate which eye will be worked on at this time?

   ____

4. List three types of medications that may be used.

   a. ____

   b. ____

   c. ____

5. What type of anesthesia will be used? ______________________________

Assignment Sheet 1

Case C continued

6. Describe two special considerations regarding the care of this patient.

   a. ______________________________

   b. ______________________________

Case D: A 60-year-old male is diagnosed as having secondary glaucoma.

1. What is glaucoma? ______________________________

2. If left untreated, what can result? ______________________________

3. List two possible surgical procedures that may be used to correct this condition.

   a. ______________________________

   b. ______________________________

4. What medication could be used to treat this condition nonsurgically? ______________

5. What instrument could be used to create a tract during surgical intervention? ______

   ____

Plastic Surgery
Unit 9

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match common plastic surgery procedures with the correct descriptions and complete statements concerning special features of these procedures. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to plastic surgery with their correct definitions.
2. List purposes of plastic surgery.
3. Match common craniofacial plastic procedures with the correct descriptions.
4. Match common plastic procedures on other areas of the body with the correct descriptions.
5. Complete statements concerning special features of plastic surgery.
6. Arrange in order the procedure for an augmentation mammoplasty.
7. Match types of burns with the correct descriptions.
8. Classify burns according to depth.
9. Match types of skin grafts with the correct descriptions of their sources.
10. Match types of autografting techniques with the correct descriptions.
11. Distinguish between the types of free grafts.
12. Match types of tissue flaps with the correct descriptions.
13. Distinguish between the types of dermatomes.
14. Select true statements concerning considerations in the care of burn patients.
15. Complete statements concerning special considerations for skin grafting procedures.

Objective Sheet

16. Match the specialized instruments, equipment, and supplies for plastic surgery with the correct uses.

17. Determine needs for given plastic surgery cases. (Assignment Sheet 1)

Plastic Surgery
Unit 9

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.
2. Review Teaching Suggestions section that follows. Plan for classroom activities.
3. Plan for students with special needs.
4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—The Skin (Objective 1)
   TM 2—Burns According to Degree (Objective 8)
   TM 3—Skin Grafts (Objective 11)
   TM 4—Use of the Skin Graft Mesher (Objective 15)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.
6. Develop teaching plan. Adjust for different learning styles.
7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.
9. Discuss unit and specific objectives.
10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.
11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.
12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Suggested Activities

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Add any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to plastic surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in plastic surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in plastic surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

Suggested Activities

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used in plastic surgery. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in plastic surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about plastic surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in plastic surgery. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

9. Divide students into groups, and assign each group a different procedure commonly performed in plastic surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic setups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo setups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

Suggested Activities

10. Show videos of procedures common to plastic surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice of plastic surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required for each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology*. Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Supplemental Resources

1. *The Scalp as a Skin Donor Site*, V-8182. 10-minute video. 1982. Presents transparent dressings as a means of promoting rapid healing of skin graft donor sites.

Suggested Activities

2. *A Cleaner Closure*, C-212. 14-minute video. Covers application of tape skin closures in the areas of general, plastic, and orthopedic surgery and emergency room wound repair.

   1 and 2 are available from:

   3M Health Care
   c/o Computer Chrome, Inc.
   2610 University Avenue
   St. Paul, MN 55114
   800-328-4827, ext. 1205

3. *Remodeling the Scars: A Burn Patient's Guide to Compression Garments*, #78004. 13-minute video. 1989. Designed to educate and motivate burn patients.

4. *Hyperbaric Oxygen Therapy: An Introduction for Patients*, #78005. 8-minute video. 1988. Designed to help patient understand the principles of HBO therapy.

5. *Giving Your Child a Smile: Correcting Cleft Lips and Palates*, #78010. 23-minute video. 1990. Explains how cleft lips and palates occur and how they are corrected.

   3 - 5 are available from:

   Medcom/Trainex
   P.O. Box 3225
   Garden Grove, CA 92641
   800-877-1443

6. *Repairing Birth Defects*, #FM-2362. 26-minute video. Explains corrective surgical procedures to correct clubfoot, cleft palate, webbed digits, asymmetric head shape, torticollis, and protruding ears.

7. *Creating and Replacing Body Parts*, #FM-1977. 28-minute video. Specially adapted Phil Donahue program that shows pediatric patients being helped by cosmetic medicine and sculpture.

8. *Microsurgery*, #FM-3141. 19-minute video. Shows how microsurgery helped a former New York Mets pitcher. Also explains improvements in surgical microscopes and microsutures.

9. *Reconstructive Surgery*, #FM-3169. 19-minute video. Shows facial reconstructions, as well as other examples of reconstructive surgery.

Suggested Activities

10. *Plastic and Reconstructive Surgery*, #FM-1429. 19-minute video. Shows how the computer aids surgeons in modeling joints, bones, and sections of the skull for plastic and reconstructive surgery.

11. *Cosmetic Surgery*, #FM-1430. 19-minute video. Shows some of the latest cosmetic surgery techniques, from collagen implants to liposuction.

    6 - 11 are available from:

    Films for the Humanities & Sciences
    P.O. Box 2053
    Princeton, NJ 08543-2053
    800-257-5126 or 609-452-1128

12. *Perioperative Care of the Burned Patient*, DG-1455. 14-minute slide program. 1983. Covers identifying, assessing, and meeting the needs of the burned patient. Available from:

    Cine-Med Distribution Center
    Davis + Geck Video Library
    P.O. Box 745
    Woodbury, CT 06898
    800-633-0004

13. *The Management and Operating Room Support of the Burn Patient*, #3594. Available from your local Ethicon, Inc. sales representative.

Plastic Surgery
Unit 9

Answers to Student Supplements

Student Supplement 1

a. Dermis
b. Epidermis
c. Cutaneous layer
d. Hair shaft
e. Sebaceous gland
f. Hair root in follicle
g. Sweat gland
h. Nerve

Student Supplement 2

1. b
2. a
3. a
4. b
5. c
6. d
7. a
8. d
9. c
10. a
11. b
12. b
13. b
14. c
15. c
16. c
17. b
18. b
19. d
20. b

Plastic Surgery
Unit 9

Answers to Assignment Sheet 1

Case A: STSG, right upper arm

1. General
2. The right arm and donor site such as the right upper thigh
3. Dermatome and mesher
4. Donor site
5. The donor site will be prepped separately with a colorless solution and is generally prepped first. Care must be taken to not cross contaminate.
6. It must be kept moist with warm normal saline.
7. Instructor should evaluate for completeness and appropriate arrangement. The following instruments should be included: delicate tissue forceps, plastic surgery scissors, and skin hooks

Case B: Bilateral breast argumentation

1. Modified Fowler's or supine with arms on armboards
2. Areolar, inframammary, or axillary
3. In pockets either behind or in front of the pectoralis muscle
4. A light gauze dressing is used and a surgical bra or an Ace wrap may be used for support.
5. Improve aesthetic (cosmetic) appearances
6. Instructor should evaluate for completeness and appropriate arrangement. Basic instrument will be used along with specialty instruments from this unit that include delicate tissue forceps, plastic surgery scissors, and skin hooks

Plastic Surgery
Unit 9

Answers to Written Test

1. a. 6
   b. 11
   c. 5
   d. 1
   e. 13
   f. 2
   g. 9
   h. 7

2. Any two of the following:

   a. To correct congenital anomalies
   b. To correct disfigurements due to trauma or disease
   c. To improve aesthetic (cosmetic) appearance

3. a. 16
   b. 7
   c. 12
   d. 1
   e. 15
   f. 9
   g. 2
   h. 17
   i. 8
   j. 4

4. a. 2
   b. 10
   c. 8
   d. 3
   e. 6
   f. 5
   g. 4
   h. 7

5. a. Delicate
   b. Pressure points
   c. Cutting
   d. Any one: Silicone, rubber, Teflon, or Dacron
   e. Any one: Bone, skin, or cartilage
   f. Colored marking pens
   g. Operating microscope
   h. Extremity
   i. Colorless
   j. Any one: Head or hand
   k. Local
   l. Nerve stimulator
   m. Any one: 2×2s, 3×3s, peanuts, or patties
   n. Aesthetic (cosmetic)
   o. Any one: Medicated, nonadhering, or pressure

6. a. 3
   b. 2
   c. 1
   d. 5
   e. 4

Answers to Written Test

7. a. 2
   b. 4
   c. 1
   d. 3

8. a. 4th
   b. 2nd
   c. 3rd
   d. 1st

9. a. 3
   b. 1
   c. 2

10. a. 3
    b. 1
    c. 2

11. a. F
    b. S
    c. S
    d. F
    e. S
    f. F
    g. F
    h. S
    i. F
    j. F
    k. F
    l. S

12. a. 3
    b. 5
    c. 1
    d. 4

13. a. O
    b. D
    c. O
    d. O
    e. D
    f. D
    g. O

14. a. T
    b. T
    c. F
    d. T
    e. T
    f. F
    g. F
    h. T
    i. F
    j. T

Answers to Written Test

15. a. Separately
    b. 3
    c. Sponges
    d. Perfect condition or working order
    e. 0
    f. Stands
    g. Blade
    h. Dry out
    i. Saline solution
    j. Any one: Pressure, thrombin, or warm saline packs
    k. Any one of the following:

        (1) Sutures or skin staples on larger grafts
        (2) Sterile adhesive strips (Steri-strips) on smaller grafts

    l. Plaster cast
    m. Dressings
    n. Any one of the following:

        (1) Meticulous aseptic technique must be followed.
        (2) Graft must remain in stabilized contact with the recipient site.
        (3) Bleeding and infection must be controlled.

16. a. Any one: 1, 9, or 10
    b. 2
    c. 6
    d. 12
    e. 7
    f. 3

Plastic Surgery
Unit 9

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

    ______a. Outer, nonsensitive, nonvascular layer of the skin

    ______b. Unusually small size or absence of the external ear(s)

    ______c. Area of the body used as a source for grafts

    ______d. Plastic surgery with non-human tissue

    ______e. Projection of jaws beyond projection of forehead

    ______f. Removal of foreign material and dead or damaged tissue from a wound

    ______g. Congenital deformity in which the ears protrude abnormally from the side of the head

    ______h. A small spot or area of the skin showing diffused redness

    1. Alloplasty
    2. Debridement
    3. Dermatome
    4. Dermis
    5. Donor site
    6. Epidermis
    7. Erythema
    8. Graft
    9. Lop ears
    10. Micrognathia
    11. Microtia
    12. Plastic surgery
    13. Prognathia
    14. Recipient site

2. List two purposes of plastic surgery.

    ____

    ____

Written Test

3. Match common craniofacial plastic procedures on the right with the correct descriptions.

______a. Aesthetic procedure to remove excess skin in the face and neck area and tighten underlying support structures, such as muscle and superficial fascia; also called a face lift

______b. Aesthetic or reconstructive procedure to correct the congenital deformities of lop ears or excessively large ears or for traumatic injury to one or both ears

______c. Correction of malocclusion and facial deformity by intermaxillary fixation with arch bars and open or closed reduction of the fractured maxilla depending upon the severity

______d. Aesthetic procedure to remove excess skin and protruding periorbital fat of the upper and lower eyelids

______e. Reconstruction of the nose for aesthetic purposes or to repair damage done by trauma or removal of neoplasms

______f. Series of reconstructive procedures to insert an artificial ear implant or graft of patient's costal cartilage to correct the congenital absence of an ear

______g. Closure of a cleft lip

______h. Aesthetic procedure involving the extraction of the patient's own fat cells or bovine dermal collagen and injection to fill soft tissue defects or to smooth out wrinkles

______i. Closure of a cleft palate

______j. Aesthetic procedure to reshape the chin by removing part of the mandible or by augmenting with bone or cartilage grafts or artificial implants for abnormally small jaws

1. Blepharoplasty
2. Cheiloplasty
3. Hair replacement (transplant)
4. Mentoplasty
5. Neck dissection
6. Orthognatic surgery
7. Otoplasty
8. Palatoplasty
9. Reconstruction for microtia
10. Removal of cancerous neoplasms
11. Repair of mandibular fracture
12. Repair of maxillary fracture
13. Repair of orbital-craniofacial deformities
14. Repair of zygomatic fracture
15. Rhinoplasty
16. Rhytidectomy
17. Soft tissue augmentation

Written Test

4. Match common plastic procedures performed on other areas of the body listed on the right with the correct descriptions.

______a. Insertion of a breast prosthesis to enlarge or form the breast mound

______b. Rearranging or reshaping an existing scar to improve its appearance

______c. Post-mastectomy reconstruction of breast contour

______d. Removal of necrotic tissue (eschar) to be followed by skin grafting

______e. Removal of fat deposits by use of a blunt, hollow, metal cannula connected to negative pressure suction

______f. Excision of excessive fat and redundant skin from various areas of the body such as the abdomen, buttocks, thighs, and upper arms

______g. Physical sanding of the skin with a dermabrader to remove embedded dirt or tatoos, improve acne scars, or lessen elevated scars

______h. Restoration of hand function to correct injuries or deformities usually involving microsurgery of nerves and vessels

1. Abdominoplasty
2. Augmentation mammoplasty
3. Debridement of burns
4. Dermabrasion
5. Lipectomies
6. Liposuction
7. Plastic hand surgery
8. Reconstructive mammoplasty
9. Reduction mammoplasty
10. Scar revision

5. Complete the following statements concerning special features of plastic surgery by filling in the blanks with the correct word(s).

a. Instruments for plastic surgery are extremely __________________ and must be handled with the utmost of care.

b. Microvascular and reconstructive procedures may take 12 to 18 hours. Patients' __________________ __________________ must be well padded.

c. Fine sutures swaged to __________________ needles are commonly used for plastic surgery.

Written Test

d. Alloplastic materials such as ________________ are commonly used as implants. They must be handled as little as possible, using sterile technique.

e. ________________ grafts may be needed.

f. Sterile ________________ are used to indicate incisional lines and geographical reference points.

g. Surgical headlights, fiberoptic headlights, loupes, and the ________________ are commonly used for plastic surgery.

h. The pneumatic tourniquet is commonly used for ________________ surgery.

i. ________________ prep solutions are often used so the surgeon can observe the true skin color.

j. ________________ drapes are commonly used; however, draping is often difficult when several areas need to be exposed, such as for skin grafting procedures.

k. ________________ anesthesia is used for many procedures on adults. Epinephrine may be added to help localize the agent, prolong the anesthetic action, and provide hemostasis.

l. The ________________ is used in many procedures to identify nerves, especially in craniofacial and hand reconstruction procedures.

m. Small sponges are used such as ________________.

n. Skin closure tapes are commonly used in conjunction with subcuticular suturing to improve the ________________ results.

o. ________________ dressings are commonly used.

6. Arrange in order the procedure for an augmentation mammoplasty by placing the correct sequence numbers (1-5) in the blanks provided.

______a. Surgeon elevates the tissue, either the breast tissue from the underlying muscle or the pectoralis muscle from the chest wall. Hemostasis is achieved using the electrosurgical unit or suture ligatures.

______b. Surgeon incises breast through an areolar, inframammary, or axillary incision.

Written Test

______c. Patient is placed in a modified Fowler's or supine position with arms on armboards and is prepped and draped as surgeon requires.

______d. Surgeon closes the wound in layers and applies a light gauze dressing. A surgical bra or an Ace wrap may be used for support.

______e. Surgeon dissects a pocket behind or in front of the pectoralis muscle and places the implant in the pocket.

7. Match types of burns listed on the right with the correct descriptions.

______a. Resulting from contact with fire, hot objects, or hot fluids

______b. Resulting from contact with corrosive or irritating acids or alkalines

______c. Resulting from overexposure to electricity

______d. Resulting from overexposure to radiant energy such as from radium, x-rays, nuclear explosions, or sunlight

1. Electrical
2. Thermal
3. Radiation
4. Chemical

8. Classify burns according to depth by placing "1st," "2nd," "3rd," or "4th" next to the correct descriptions.

______a. Char burn which extends damage into bones, tendons, muscles, blood vessels, and peripheral nerves below. Requires extensive grafting.

______b. Partial-thickness burn in which damage extends through the epidermis and into the dermis but reepithelialization can occur if the deepest layer of the epithelium is viable. Characterized by blister formation, pain, and a moist, red or pink appearance.

______c. Full-thickness burn in which both epidermis and dermis are destroyed with damage extending into underlying subcutaneous fat. Characterized by a dry, pearly-white, or charred-appearing surface void of sensation with a parchmentlike eschar over the area formed by the destroyed skin. Requires skin grafts for healing.

______d. Superficial burn involving only the outer layer of the epidermis. Erythema and tenderness occur, but healing takes place rapidly.

Written Test

9. Match types of skin grafts on the right with the correct descriptions of their sources.

_____a. Graft of tissue taken from another part of the patient's body

_____b. Graft of tissue taken from a donor of the same species as the recipient

_____c. Graft of tissue taken from a donor of one species and grafted onto a recipient of another species

1. Homograft
2. Heterograft (xenograft)
3. Autograft

10. Match types of autografting techniques on the right with the correct descriptions.

_____a. Tissue, including its vascular bundle, is detached and transferred to the recipient site. Anastomosis between arteries and veins at the recipient site is accomplished with microvascular surgery.

_____b. Tissue is completely detached from the donor site and moved to the recipient site. Vascularity depends on capillary ingrowth at the recipient site.

_____c. Tissue remains attached at one or both ends of the donor site during transfer to the recipient site.

1. Free graft
2. Pedicle flap
3. Free flap

11. Distinguish between the types of free grafts by placing an "F" next to the descriptions of full-thickness grafts and an "S" next to those of split-thickness grafts.

_____a. Are preferred on the face, neck, hands, elbows, axillae, knees, and feet

_____b. Are used to cover large denuded areas on body surfaces such as back, trunk, and legs

_____c. Graft can be enlarged by putting it through a skin graft mesher.

_____d. Inhibit wound contraction better

_____e. Involve removal of epidermis and a portion of the dermis to a depth of .010-.035" (.3-1 mm)

Written Test

_______f. Involve removal of epidermis, dermis, and subcutaneous fat at a depth greater than .035" (1 mm)

_______g. Are excised from donor site by skin-graft knife

_______h. Are excised from donor site by dermatomes

_______i. Are smaller in diameter

_______j. Donor site must be grafted or primarily closed because it will not heal on its own.

_______k. Donor site cannot be reused.

_______l. Skin at donor site regenerates rapidly if properly cared for, and site can be reused approximately 2 weeks later if necessary.

12. Match types of tissue flaps on the right with the correct descriptions.

_______a. Donor tissue involves muscle and its proximal blood supply

_______b. Donor tissue is mobilized and used to cover defects exposing vital organs

_______c. Donor tissue intended for later transplant is elevated and a silicone pouch connected to a self-sealing inflation reservoir is inserted and expanded to stretch the skin to be transplanted, and therefore provide a larger flap

_______d. Donor tissue involves sensory nerves for transplant

1. Tissue expansion flap
2. Myocutaneous flap
3. Muscle flap
4. Neurosensory flap
5. Omental flap

13. Distinguish between the types of dermatomes by placing a "D" next to the descriptions of drum dermatomes and an "O" next to those of oscillating-blade dermatomes

_______a. Are electrically or pneumatically power driven

_______b. Have a rotating blade housed in one-half of a metal drum

_______c. Have a blade that moves back and forth like the blade of a hair cutter _______d. Are used on areas that have firm, underlying support, and therefore, are rarely used on the abdominal wall

_______e. Are used on flat, open areas because they are bulky

_______f. An adhesive must be placed on both the skin surface and the drum to keep the skin in contact with the drum surface.

_______g. Sterile mineral oil may be used on the donor site to facilitate its removal.

14. Select true statements concerning considerations in the care of burn patients by placing a "T" next to the true statements and an "F" next to the false statements.

_______a. Strict adherence to all the principles of aseptic technique must be followed to prevent infection.

_______b. The patient's environment is controlled and isolated to aid in the healing process, to prevent microbial invasion, and to protect the patient from hypothermia which is a common problem due to the loss of skin.

_______c. Burn patients usually do not require any assistance in moving.

_______d. Delays in transporting or scheduling for surgery must be avoided.

_______e. Hypo-hyperthermia units are used in surgery to prevent heat loss.

_______f. The patient's temperature is checked occasionally throughout the procedure with an oral thermometer.

_______g. O.R. room temperature is raised to 92°-95°F.

_______h. Prepping, irrigation, dressing, and intravenous solutions are all warmed prior to use.

_______i. The patient is covered with wet sheets.

_______j. Most burn patients coming to the O.R. are anxious and apprehensive and will need special comforting, reassurance, and support.

Written Test

15. Complete the following statements concerning special considerations for skin grafting procedures by filling in the blanks with the correct answers.

    a. Donor and recipient sites are prepped and draped __________________, and care is taken to prevent cross contamination from one site to the other.

    b. Prepping is done very gently, and usually for only __________________ minutes.

    c. The patient's intake and output must be carefully monitored including IVs, urine, and blood loss. __________________ are weighed to estimate blood loss.

    d. Dermatomes must be carefully inspected prior to the procedure to make sure that all parts are in __________________.

    e. Depth gauges of dermatomes should always be set on __________________ before the procedure and after changing blades.

    f. Dermatomes are to be kept on their __________________ at all times except while being used to obtain skin grafts.

    g. The __________________ of the drum dermatome must not be allowed to swing free since it could result in flexor tendon laceration for the operator.

    h. Grafts must not be allowed to __________________ which would destroy them.

    i. Grafts are placed in a basin with a few drops of warm __________________ unless otherwise requested by the surgeon.

    j. Hemostasis is obtained during the operation using __________________.

    k. One method used to secure the graft to the recipient site is __________________.

    l. A __________________ is frequently applied to immobilize extremities during migration or transfer of pedicle grafts.

    m. __________________ over grafts vary according to surgeon preference.

    n. One requirement that must be met for grafts to heal or "take" is __________________.

Written Test

16. Match the specialized instruments, equipment, and supplies for plastic surgery on the right with the correct uses.

______a. Used to shape bone

______b. Used for making precision measurements

______c. Used to replace diseased, injured, or missing body parts such as organs, limbs, joints, and tendons or to augment body parts such as breasts or chins

______d. Used to retract dermis and provide exposure to underlying structures; may have single or double prongs

______e. Used to remove fat and reshape various areas of the body

______f. Used to remove acne scars, birthmarks, tatoos, and fine wrinkles on the epidermis

1. Bone curettes
2. Caliper
3. Dermabrader
4. Dermatome
5. Forceps, delicate tissue and dressing
6. Implants and prostheses
7. Liposuction curettes and liposuction vacuum machine
8. Nerve retractor
9. Osteotome
10. Rasp
11. Scissors (several types)
12. Skin hook
13. Tissue expanders

***Permission to duplicate this test is granted.**

Plastic Surgery
Unit 9

Unit Evaluation Form

Student Name ________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Plastic Surgery Cases Rating ______

Comments: ________________________________

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ________________________________

____

Teacher Signature ________________________ Date __________

Student Signature ________________________ Date __________

*Permission to duplicate this form is granted.

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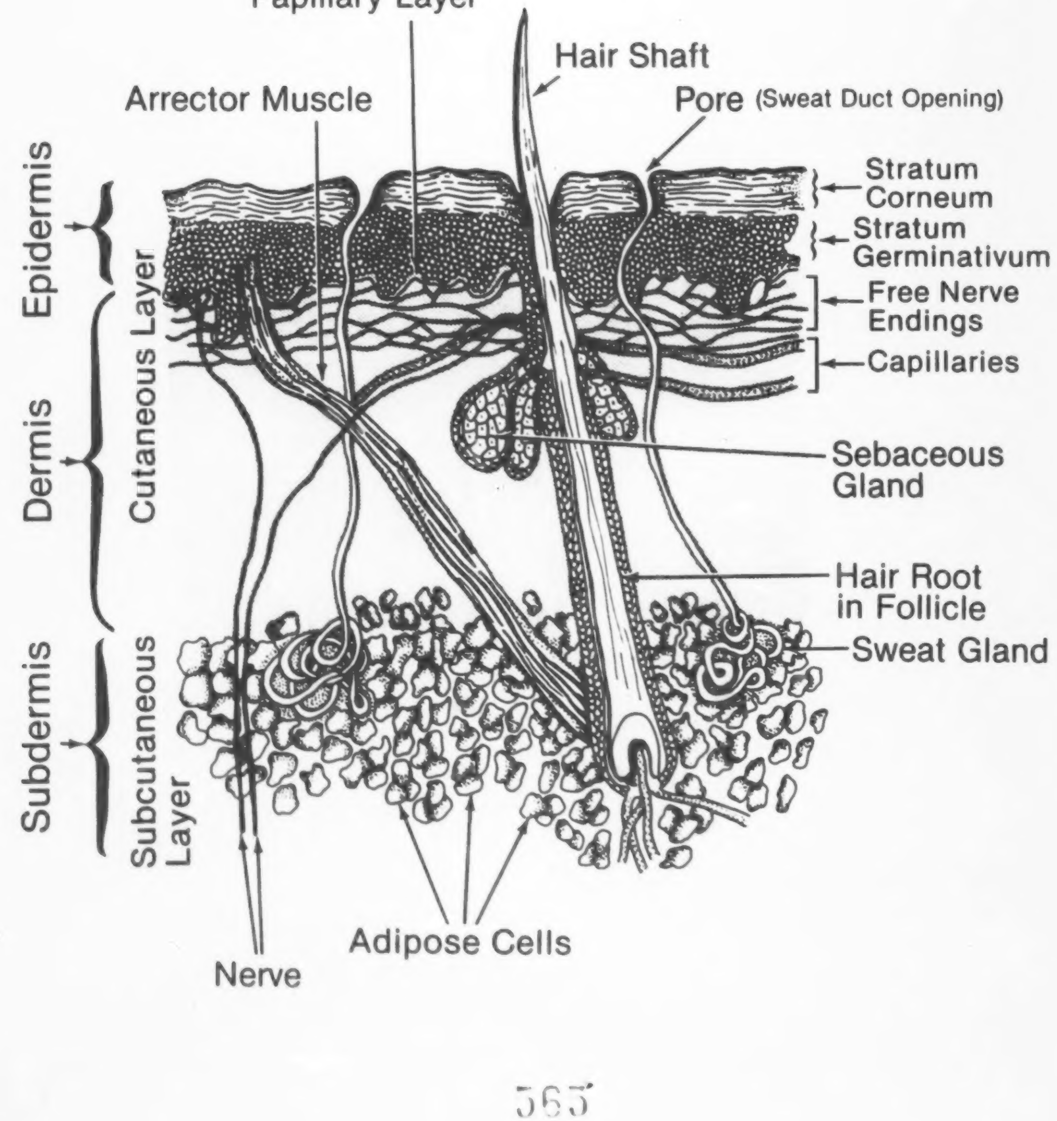
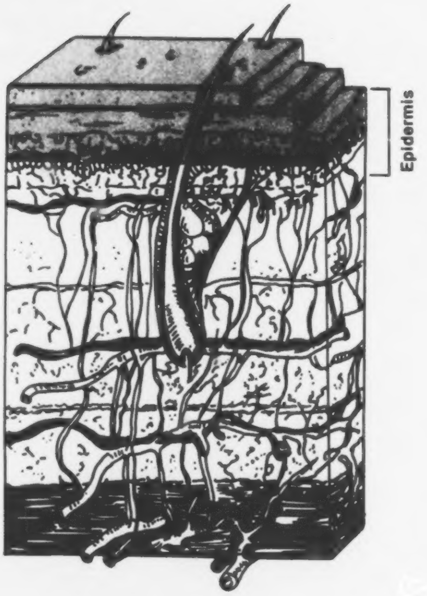
The Skin

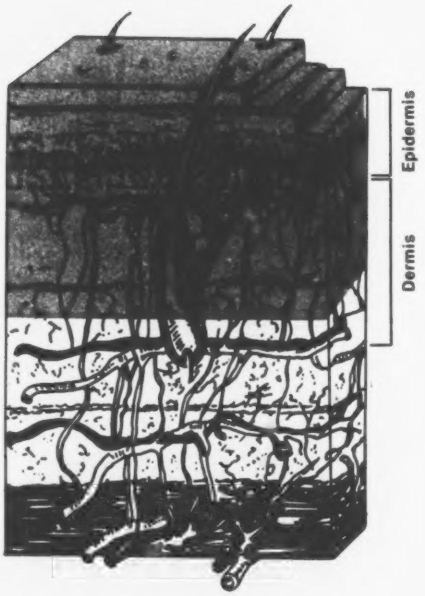

Papillary Layer
Hair Shaft
Arrector Muscle
Pore (Sweat Duct Opening)
Epidermis
Dermis
Subdermis
Cutaneous Layer
Subcutaneous Layer
Stratum Corneum
Stratum Germinativum
Free Nerve Endings
Capillaries
Sebaceous Gland
Hair Root in Follicle
Sweat Gland
Nerve
Adipose Cells

565

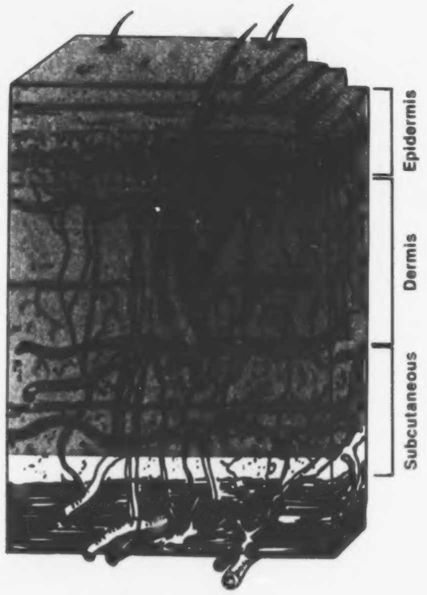
Burns According to Degree



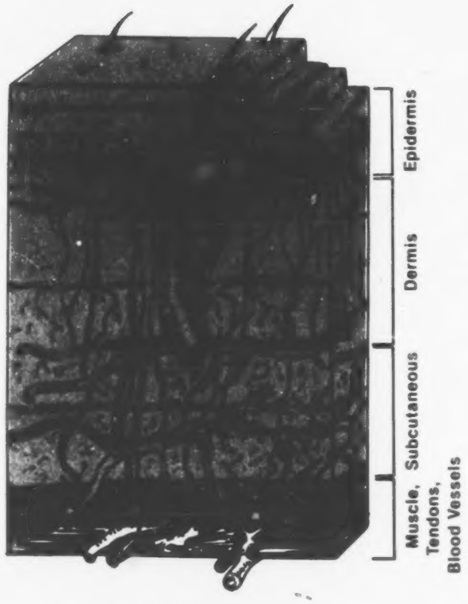
1st Degree


Epidermis
Dermis

2nd Degree

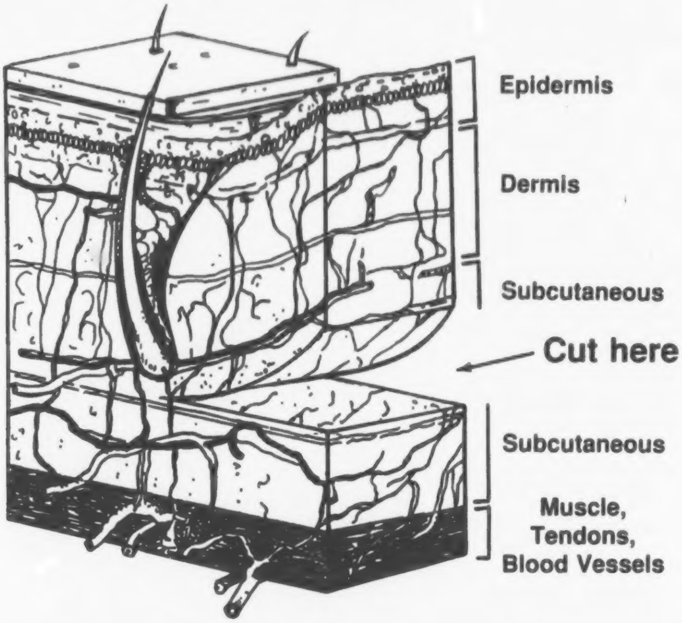

Epidermis
Dermis
Subcutaneous

3rd Degree

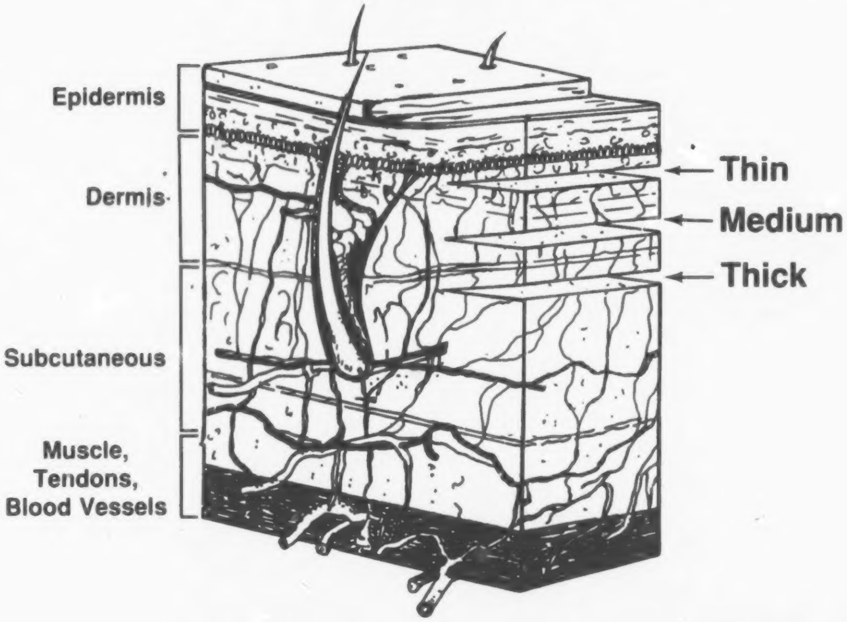

Epidermis
Dermis
Subcutaneous
Muscle,
Tendons,
Blood Vessels

4th Degree

Skin Grafts

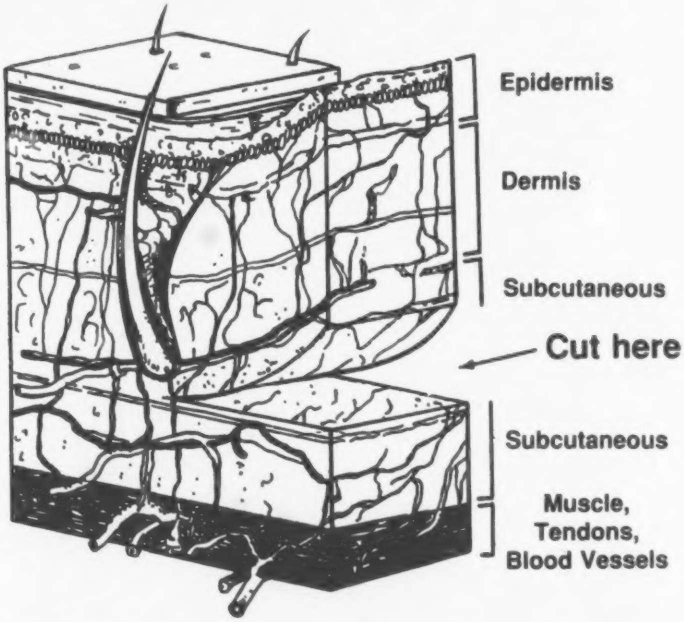

Epidermis
Dermis
Subcutaneous
Cut here
Subcutaneous
Muscle, Tendons, Blood Vessels

Full-Thickness Skin Graft (FTSG)

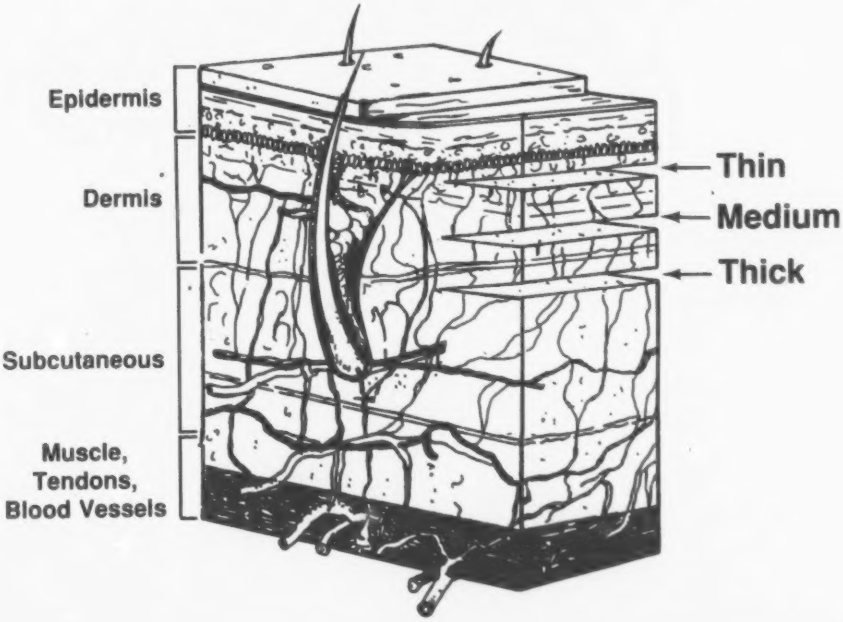

Epidermis
Dermis
Subcutaneous
Muscle, Tendons, Blood Vessels
Thin
Medium
Thick

Split-Thickness Skin Graft (STSG)

Skin Grafts

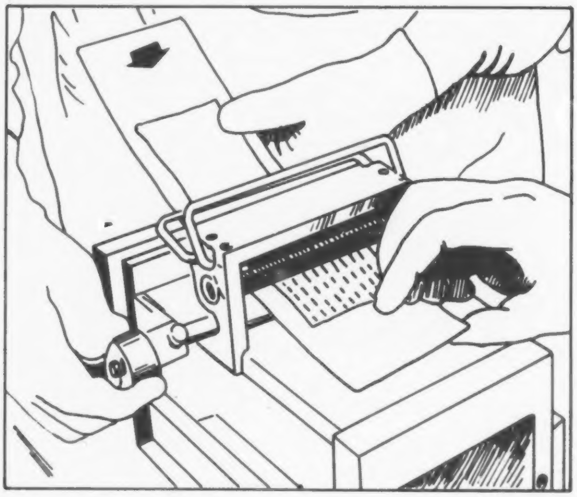

Epidermis
Dermis
Subcutaneous
Cut here
Subcutaneous
Muscle, Tendons, Blood Vessels

Full-Thickness Skin Graft (FTSG)

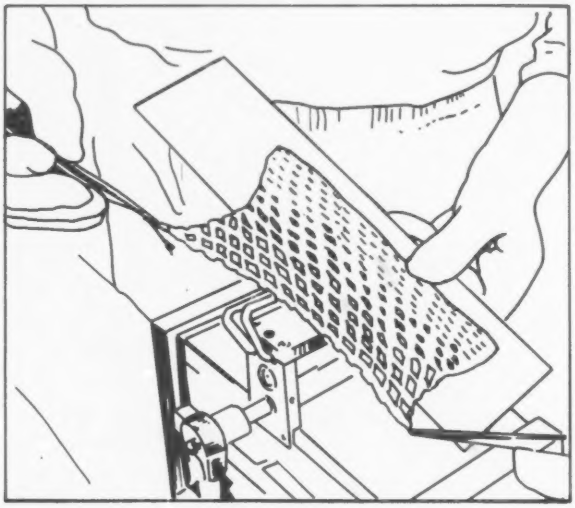

Epidermis
Dermis
Subcutaneous
Muscle, Tendons, Blood Vessels
Thin
Medium
Thick

Split-Thickness Skin Graft (STSG)

Use of the Skin Graft Mesher



A split-thickness graft being meshed in the skin graft mesher



Expansion of the split-thickness graft after being passed through the skin graft mesher

Plastic Surgery
Unit 9

Information Sheet

1. **Terms and definitions**

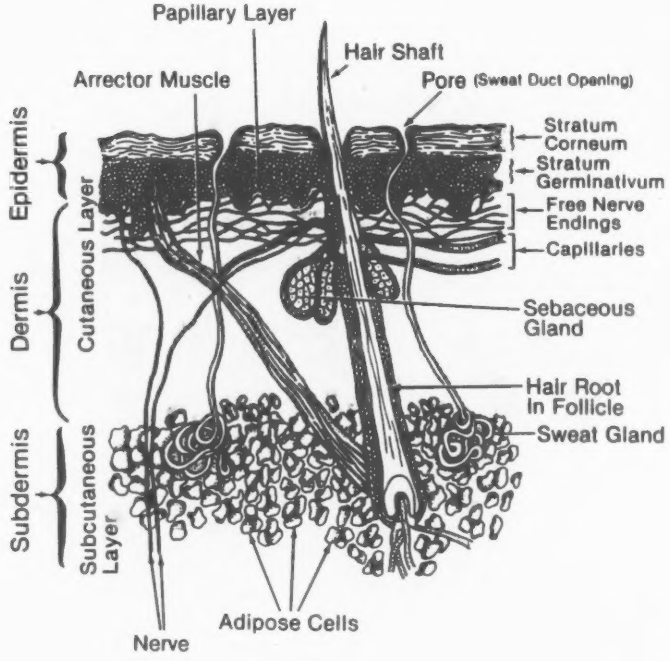
   a. **Alloplasty** — Plastic surgery with non-human tissue

   b. **Debridement** — Removal of foreign material and dead or damaged tissue from a wound

   c. **Dermatome** — Instrument for incising the skin, for cutting thin transplants of skin, or for use as a debridement device

   d. **Dermis** — Inner, sensitive, vascular layer of the skin

Figure 1 — The Skin


Papillary Layer
Hair Shaft
Arrector Muscle
Pore (Sweat Duct Opening)
Epidermis
Stratum Corneum
Stratum Germinativum
Free Nerve Endings
Capillaries
Cutaneous Layer
Dermis
Sebaceous Gland
Hair Root in Follicle
Sweat Gland
Subdermis
Subcutaneous Layer
Adipose Cells
Nerve

   e. **Donor site** — Area of the body used as a source for grafts

   f. **Epidermis** — Outer, nonsensitive, nonvascular layer of the skin

   g. **Erythema** — Small spot or area of the skin showing diffused redness

Information Sheet

h. **Graft** — Tissue that is transplanted or implanted in a part of the body to repair a defect

i. **Lop ears** — Congenital deformity in which the ears protrude abnormally from the side of the head

j. **Micrognathia** — Abnormal smallness of jaws, especially the lower jaw

k. **Microtia** — Unusually small size or absence of the external ear(s)

l. **Plastic surgery** — Surgery designed to repair, restore, or reconstruct body structures

Note: The word *plastic* is derived from the Greek word *plastos* which means "to mold or form."

m. **Prognathia** — Projection of jaws beyond projection of forehead

n. **Recipient site** — Area of the body that receives grafts

2. **Purposes of plastic surgery**

a. To correct congenital anomalies

b. To correct disfigurements due to trauma or disease

c. To improve aesthetic (cosmetic) appearance

3. **Common craniofacial plastic procedures and their descriptions**

a. **Blepharoplasty** — Aesthetic procedure to remove excess skin and protruding periorbital fat of the upper and lower eyelids

Note: Although this procedure is usually done to improve the patient's appearance, it is occasionally also used to improve the patient's vision when sagging skin from the upper lids has interfered with the patient's eyesight.

b. **Cheiloplasty** — Closure of a cleft lip (congenital defect)

c. **Hair replacement (transplant)** — Aesthetic transplant of hair follicles from scalp areas with good hair growth to balding areas

Note: This may involve the use of tissue expanders and may take several transplants.

d. **Mentoplasty** — Aesthetic procedure to reshape the chin by removing part of the mandible or by augmenting with bone or cartilage grafts or artificial implants for abnormally small jaws

Information Sheet

e. **Neck dissection** — Resection of tumors originating in the head and neck region

Note: The primary dissection may be performed by a laryngologist, head and neck oncologist, oral surgeon, or plastic surgeon.

f. **Orthognatic surgery** — Reconstruction with alignment of the maxilla and/or mandible for correction of congenital defects

Note: Malocclusion of teeth may be performed by oral and/or plastic surgeons.

g. **Otoplasty** — Aesthetic or reconstructive procedure to correct the congenital deformities of lop ears or excessively large ears or for traumatic injury to one or both ears

h. **Palatoplasty** — Closure of a cleft palate (congenital defect)

i. **Reconstruction for microtia** — Series of reconstructive procedures to insert an artificial ear implant or graft of patient's costal cartilage to correct the congenital absence of an ear

j. **Removal of cancerous neoplasms** — Basal-cell carcinoma, squamous-cell carcinoma, and malignant melanoma are removed by use of:

(1) Sharp dissection—suturing and/or grafting
(2) Electrosurgery curettage
(3) Cryosurgery
(4) Laser surgery
(5) Radiation therapy
(6) Mohs micrographic surgery

Note: This is used to excise advanced, recurrent lesions such as malignant melanomas. The bulk of the tumor is removed in sections, and a map is made of the tumor with local lymph nodes excised.

k. **Repair of mandibular fracture** — Correction of malocclusion by closed reduction of fractured mandible with intermaxillary fixation by applying arch bars to maxillary and mandibular teeth; for more severe fractures, an open reduction with internal wire fixation is needed, along with arch bars for intermaxillary fixation

Information Sheet

l. **Repair of maxillary fracture** — Correction of malocclusion and facial deformity by intermaxillary fixation with arch bars and open or closed reduction of the fractured maxilla depending upon the severity classified as follows:

  (1) Le Fort I (transverse maxillary fracture) — Closed reduction with intermaxillary fixation by arch bars
  (2) Le Fort II (pyramidal maxillary fracture) — Closed reduction with arch bars, or open reduction and internal wire fixation for more severe fractures in addition to arch bars
  (3) Le Fort III (craniofacial dysfunction with nasal and zygomatic fractures) — Open reduction and internal wire fixation along with intermaxillary fixation by arch bars

m. **Repair of orbital-craniofacial deformities** — Procedures to reconstruct cranial, facial, and orbital bones

Note: Procedures are extensive and long (6-8 hours) and may involve a multidisciplinary approach including dental, neurological, ophthalmic, and plastic surgeons. Anomalies may be caused by hypertelorism, Crouzon disease, exophthalmos, and Apert's syndrome.

n. **Repair of zygomatic fractures** — Closed reduction for zygomatic arch fractures, and open reduction and internal fixation for trimalar fractures

o. **Rhinoplasty** — Reconstruction of the nose for aesthetic purposes or to repair damage done by trauma or removal of neoplasms

p. **Rhytidectomy** — Aesthetic procedure to remove excess skin in the face and neck area and tighten underlying support structures, such as muscle and superficial fascia; also called a face lift

q. **Soft tissue augmentation** — Aesthetic procedure involving the extraction of the patient's own fat cells (micro-lipo extraction) or bovine dermal collagen and injection to fill soft tissue defects or to smooth out wrinkles

4. **Common plastic procedures performed on other areas of the body and their descriptions**

a. **Abdominoplasty** — Excision of excess fat and abdominal wall skin and tightening of the abdominal musculature

b. **Debridement of burns** — Removal of necrotic tissue (eschar) to be followed by skin grafting

c. **Dermabrasion** — Physical sanding of the skin with a dermabrader to remove embedded dirt or tatoos, improve acne scars, or lessen elevated scars

Information Sheet

d. **Lipectomies** — Excision of excessive fat and redundant skin from various areas of the body such as the abdomen, buttocks, thighs, and upper arms

e. **Liposuction (suction assisted lipectomy)** — Removal of fat deposits by use of a blunt, hollow, metal cannula connected to negative pressure suction

f. **Mammoplasty** — Surgical reconstruction of the breast(s)

   (1) **Augmentation mammoplasty** — Insertion of a breast prosthesis to enlarge or form the breast mound

   (2) **Reconstructive mammoplasty** — Post-mastectomy reconstruction of breast contour with the use of muscle flaps and/or tissue expanders

   (3) **Reduction mammoplasty** — Excision of excessive breast tissue and its overlying skin with reconstruction of breast contour, size, shape, and symmetry

g. **Plastic hand surgery** — Restoration of hand function to correct injuries or deformities usually involving microsurgery of nerves and vessels; may be needed because of:

   (1) Injuries

   - Tendons — Sutured or grafted
   - Fractures — Internal fixation
   - Severed nerves — Sutured or grafted
   - Blood vessels — Sutured
   - Severed digits — Reattached (involves vessels, nerves, tendons, and bones)

   (2) Deformities

   - Congential — Syndactylism (fused digits)—Released with possible grafting
   - Joints — Arthroplasty—Fusion or replacement
   - Fascial tissue contractures—Dupuytren's contracture — Release of palmar fascia

h. **Scar revision** — Rearranging or reshaping an existing scar to improve its appearance

Note: This may simply be an excision of a wide scar and the resuturing of its edges, or it may involve various scar revision techniques such as Z-plasty, W-plasty, or Y-V-plasty for more extensive or contracted scars.

Information Sheet

5. Special features of plastic surgery

a. Instruments for plastic surgery are extremely delicate and must be handled with the utmost of care.

b. Instruments are small for handling delicate tissues.

Examples: Iris scissors, mosquito hemostats, fine-tipped forceps, small clamps and retractors, small needleholders

c. Microvascular and reconstructive procedures may take 12 to 18 hours. Patients' pressure points must be well padded.

d. Fine sutures swaged to cutting needles are commonly used for plastic surgery. Sizes range from 2-0 to 8-0 depending upon the tissue. 8-0 to 11-0 is typically used on microsurgery.

e. Alloplastic materials such as Dacron, silicone rubber, and Teflon are commonly used as implants. They must be handled as little as possible, using sterile technique and following manufacturer's specifications.

f. Bone, cartilage, or skin grafts may be needed.

g. Sterile colored marking pens are used to indicate incisional lines and geographical reference points.

h. Surgical headlights, fiberoptic headlights, loupes, and the operating microscope are commonly used for plastic surgery.

i. The bipolar electrosurgical unit is commonly used.

j. Specialized mechanical devices such as drills and dermatomes are commonly used.

k. The pneumatic tourniquet is commonly used for extremity surgery, especially hand surgery.

l. Colorless prep solutions are often used so the surgeon can observe the true skin color.

m. Head drapes and hand drapes are commonly used; however, draping is often difficult when several areas need to be exposed, such as for skin grafting procedures.

n. Local anesthesia is used for many procedures on adults. Epinephrine may be added to help localize the agent, prolong the anesthetic action, and provide hemostasis.

Information Sheet

o. The nerve stimulator is used in many procedures to identify nerves, especially in craniofacial and hand reconstruction procedures.

p. Small sponges are used such as 2×2s, 3×3s, peanuts, and patties.

q. Skin closure tapes are commonly used in conjunction with subcuticular suturing to improve the aesthetic results.

r. Medicated and nonadhering dressings are commonly used.

s. Pressure dressings are frequently used following extensive operations.

6. Procedure for an augmentation mammoplasty

a. Patient is placed in a modified Fowler's or supine position with arms on armboards and is prepped and draped as surgeon requires.

b. Surgeon incises breast through an areolar, inframammary, or axillary incision.

c. Surgeon elevates the tissue, either the breast tissue from the underlying muscle or the pectoralis muscle from the chest wall. Hemostasis is achieved using the electrosurgical unit or suture ligatures.

d. Surgeon dissects a pocket behind or in front of the pectoralis muscle and places the implant in the pocket.

e. Surgeon closes the wound in layers and applies a light gauze dressing. A surgical bra or an Ace wrap may be used for support.

7. Types of burns

a. **Thermal** — Resulting from contact with fire, hot objects, or hot fluids

b. **Chemical** — Resulting from contact with corrosive or irritating chemicals such as acids or alkalines

c. **Electrical** — Resulting from overexposure to electricity

d. **Radiation** — Resulting from overexposure to radiant energy such as from radium, x-rays, nuclear explosions, or sunlight

Information Sheet

8. Classifications of burns according to depth

a. **First degree burn**

(1) Superficial burn involving only the outer layer of the epidermis

(2) Erythema and tenderness occur, but healing takes place rapidly.

b. **Second degree burn**

(1) Partial-thickness burn in which damage extends through the epidermis and into the dermis; reepithelialization can occur if the deepest layer of the epithelium is viable.

(2) Characterized by blister formation, pain, and a moist, red or pink appearance

Note: If secondary infection results, the damage from a second degree burn may be equivalent to that of a third degree.

Figure 2 — First degree burn

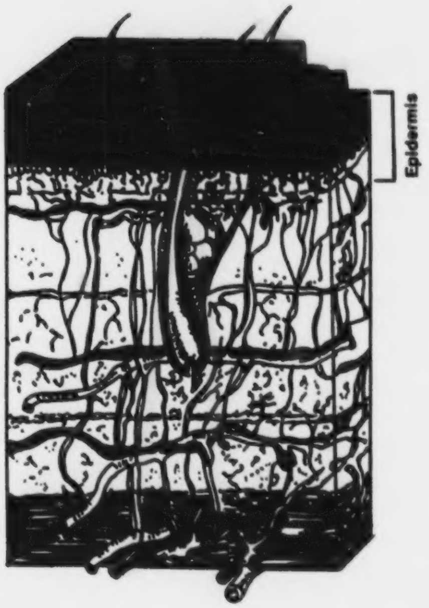
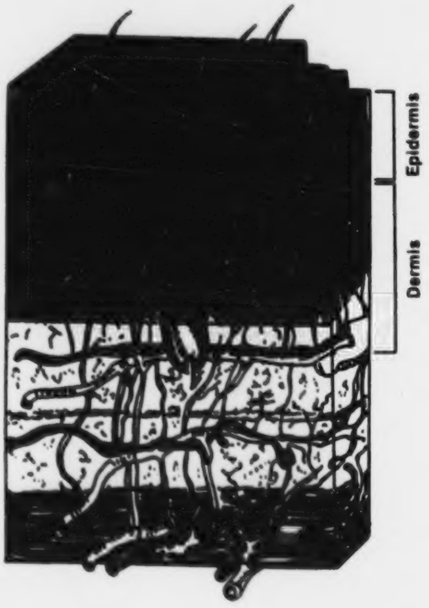


Figure 3 — Second degree burn



Information Sheet

c. **Third degree burn**

(1) Full-thickness burn in which both epidermis and dermis are destroyed with damage extending into underlying subcutaneous fat

(2) Characterized by a dry, pearly-white, or charred-appearing surface void of sensation with a parchmentlike eschar over the area formed by the destroyed skin

(3) Requires skin grafts for healing

d. **Fourth degree burn**

(1) Char burn which extends damage into bones, tendons, muscles, blood vessels, and peripheral nerves below

(2) Frequently seen with electrical burns

(3) Requires extensive grafting

Figure 4 — Third degree burn

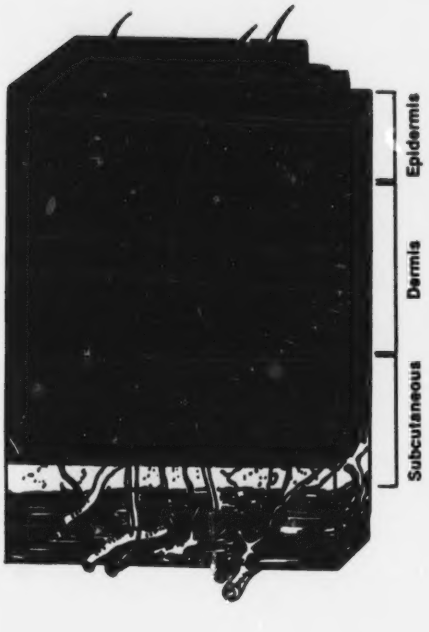

Epidermis
Dermis
Subcutaneous

Figure 5 — Fourth degree burn

Epidermis
Dermis
Subcutaneous
Muscle, Tendons, Blood Vessels

Information Sheet

9. Types of skin grafts and descriptions of their sources

a. **Autograft** — Graft of tissue taken from another part of the patient's body

Note: These are intended to be permanent replacements.

b. **Homograft** — Graft of tissue taken from a donor of the same species as the recipient

Note: These are primarily from human cadaver skin which has been donated and preserved in a skin bank.

c. **Heterograft (xenograft)** — Graft of tissue taken from a donor of one species (most commonly pigskin) and grafted onto a recipient of another species

Note: These are used as a temporary means of dressing to reduce fluid loss of the patient through evaporation and to help protect the wound. The use of synthetic skin substitutes has also been successful.

10. Autografting techniques

Note: Autografts are classified by the source of their vascular supply and tissue involved.

a. **Free grafts** (also called composite grafts) — Tissue is completely detached from the donor site and moved to the recipient site. Vascularity depends on capillary ingrowth at the recipient site.

b. **Tissue flaps** — Tissue is detached from one area of the body and transferred to the recipient site with part or all of its blood supply.

(1) **Pedicle flap** — Tissue remains attached at one or both ends of the donor site during transfer to the recipient site. Vascular supply is maintained from the vessels preserved in the pedicle of the donor site.

Note: When the new recipient site begins to receive its own nourishment, the flap can be detached from the donor site.

(2) **Free flap** — Tissue, including its vascular bundle, is detached from the donor site and transferred to the recipient site. Anastomosis between arteries and veins at the recipient site is accomplished with microvascular surgery.

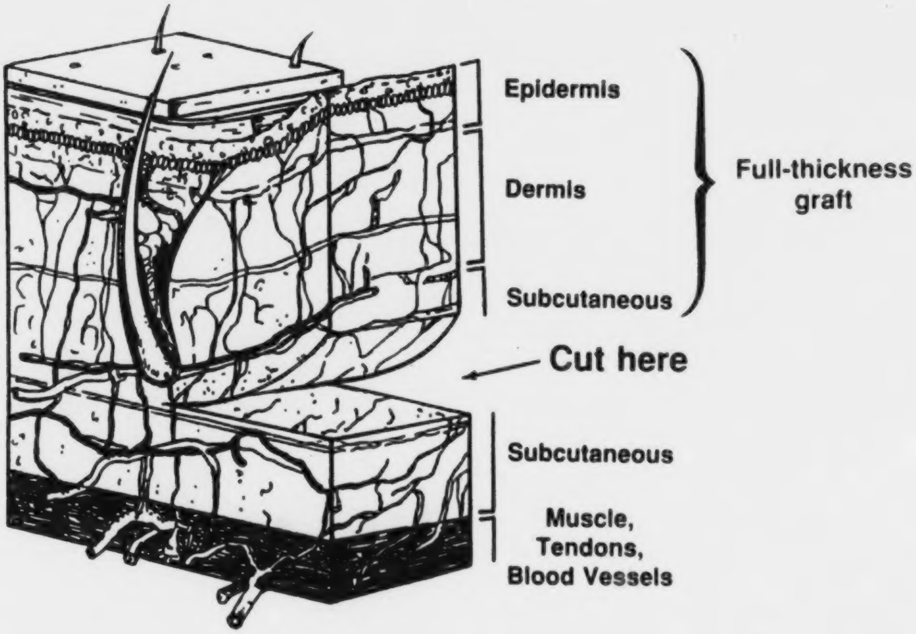
Information Sheet

11. Types of free grafts

a. Full-thickness grafts

(1) Involve removal of epidermis, dermis, and subcutaneous fat at a depth greater than .035″ (1 mm)

Figure 6 — Full-thickness skin graft (FTSG)


Epidermis
Dermis
Subcutaneous
Full-thickness graft
Cut here
Subcutaneous
Muscle, Tendons, Blood Vessels

(2) Inhibit wound contraction better than split-thickness grafts

(3) Are preferred on the face, neck, hands, elbows, axillae, knees, and feet

(4) Are smaller in diameter than split-thickness grafts

(5) Are excised from donor site by skin-graft knife

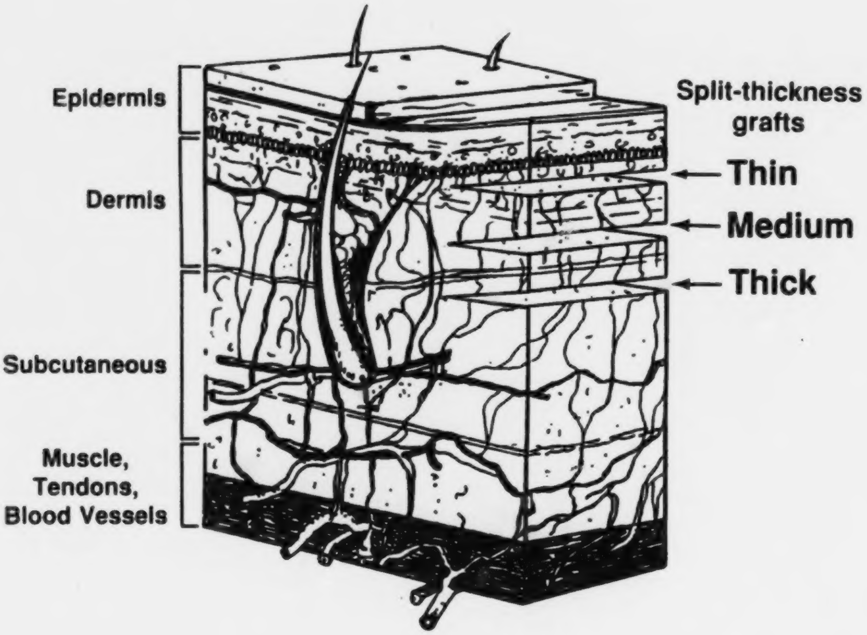
(6) Donor site must be grafted or primarily closed because it will not heal on its own.

(7) Donor site cannot be reused.

b. **Split-thickness (partial-thickness) grafts**

(1) Involve removal of epidermis and a portion of the dermis to a depth of .010-.035″ (.3-1 mm)

Figure 7 — Split-thickness skin graft (STSG)


Epidermis
Dermis
Subcutaneous
Muscle, Tendons, Blood Vessels
Split-thickness grafts
Thin
Medium
Thick

(2) Are used to cover large denuded areas on body surfaces such as back, trunk, and legs

(3) Are excised from donor site by dermatomes

(4) Skin at donor site regenerates rapidly if properly cared for, and site can be reused approximately 2 weeks later if necessary.

(5) Graft can be enlarged by putting it through a skin graft mesher.

Information Sheet

12. Types of tissue flaps

Note: Tissue flaps are used to cover areas with extensive tissue loss such as exposed bone, tendons, and nerves

a. **Tissue expansion flap** — Donor tissue intended for later transplant is elevated and a silicone pouch connected to a self-sealing inflation reservoir is inserted and expanded to stretch the skin to be transplanted, and therefore provide a larger flap

b. **Myocutaneous (musculocutaneous) flap** — Tissue to be used includes muscle, fascia, subcutaneous fat, and skin.

Example: Latissimus dorsi flap is used for breast reconstruction following a modified mastectomy.

c. **Muscle flap** — Donor tissue involves muscle tissue and its proximal blood supply.

Example: Gluteus maximus flap may be rotated to cover an ulcerated area and a split thickness skin graft may be used to cover the muscle.

d. **Neurosensory flap** — Donor tissue involves sensory nerves as a flap to provide sensation to an important area such as hands or feet.

e. **Omental flap** — Omental tissue is mobilized to cover defects exposing vital organs.

Example: Coverage of a defect in the chest wall following radiation necrosis

13. Types of dermatomes

a. **Drum dermatomes**

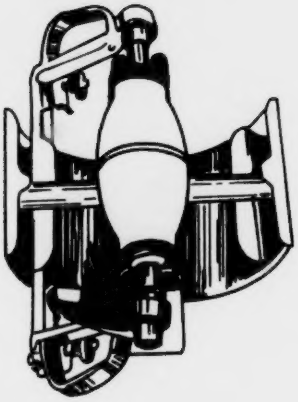
(1) Have a rotating blade housed in one-half of a metal drum

(2) Are used on flat, open areas because they are bulky

Information Sheet

(3) An adhesive must be placed on both the skin surface and the drum to keep the skin in contact with the drum surface.

Figure 8 — Drum dermatome (Padgett-Hood)



b. **Oscillating-blade dermatomes**

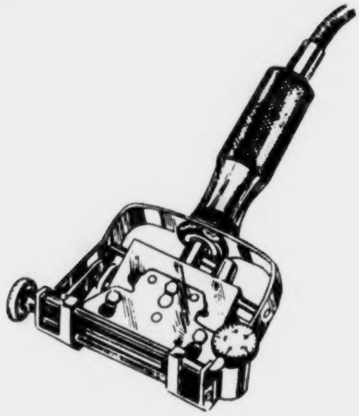
(1) Have a blade that moves back and forth like the blade of a hair cutter

(2) Are electrically or pneumatically power driven

(3) Are used on areas that have firm, underlying support, and therefore, are rarely used on the abdominal wall

(4) Sterile mineral oil may be used on the donor site to facilitate its removal.

Figure 9 — Oscillating-blade dermatome (Brown)



Information Sheet

14. Considerations in the care of burn patients

a. Strict adherence to all the principles of aseptic technique must be followed to prevent infection.

   Note: Septicemia and pneumonia account for many deaths of severely burned patients. Every effort must be taken to prevent these.

b. The patient's environment is controlled and isolated to aid in the healing process, to prevent microbial invasion, and to protect the patient from hypothermia which is a common problem due to the loss of skin.

c. Environmental measures may include:

   (1) Laminar air flow (filtered, moving air)

   (2) Plastic isolator (bubble) so personnel do not directly enter the isolation unit

   (3) Hyperbaric chamber to promote healing with pressurized high oxygen content

d. Adequate personnel and special care are required to move the burned patient.

   (1) Intravenous lines must be carefully guarded.

   (2) The artificial airway, tracheotomy tube, or endotracheal tube must not be dislodged.

e. Delays in transporting or scheduling for surgery must be avoided.

f. Adjustments are made in O.R. to prevent heat loss.

   (1) Hypo-hyperthermia units are used.

   (2) The patient's temperature is monitored throughout the procedure with a rectal, esophageal, or tympanic probe.

   (3) O.R. room temperature is raised to 80-85°F.

   (4) Prepping, irrigation, dressing, and intravenous solutions are all warmed prior to use.

   (5) The patient is covered with warm blankets as needed.

Information Sheet

g. Most burn patients coming to the O.R. are anxious and apprehensive and will need special comforting, reassurance, and support.

h. Burn patients are some of the most critically ill patients seen in O.R., and present one of the greatest challenges to the O.R. team's knowledge and skills.

15. Special considerations for skin grafting procedures

a. Prepping

(1) Colorless, antiseptic agents are used for prepping so the surgeon can see true skin color and vascularity of donor graft.

(2) Donor and recipient sites are prepped and draped separately, and care is taken to prevent cross contamination from one site to the other.

(3) Prepping is done very gently, and usually for only 3 minutes, instead of the longer periods required for normal skin.

b. The patient's intake and output must be carefully monitored including IVs, urine, and blood loss. Sponges are weighed to estimate blood loss. (1 gm = 1 cc)

c. Dermatomes are used for split-thickness grafts. These are delicate, precision instruments that must be handled with care.

(1) Dermatomes must be carefully inspected prior to the procedure to make sure that all parts are in perfect condition and working order.

(2) Depth gauges of dermatomes should always be set on 0 before the procedure and after changing blades.

(3) Dermatomes are handled carefully so the depth gauge is not disturbed.

(4) Dermatomes are to be kept on their stands at all times except while being used to obtain skin grafts.

(5) Dermatome blades may be attached by the surgical technologist; however, some surgeons prefer to put on and change their own blades.

Note: Always check the surgeon's preference.

Caution: The blade of the drum dermatome must not be allowed to swing free since it could result in flexor tendon laceration for the operator.

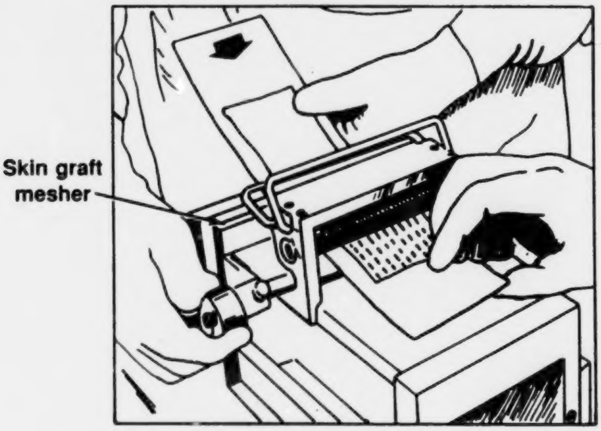
Information Sheet

(6) Drum dermatomes may be cleaned in the ultrasonic cleaner, but oscillating dermatomes must be cleaned by hand according to the manufacturer's instructions.

d. Use of the skin graft mesher

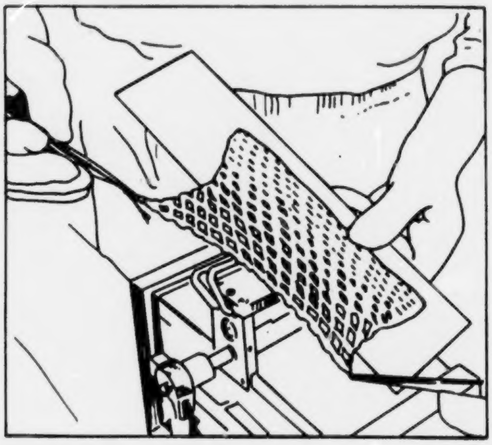
(1) Is used to cut small slits in split-thickness grafts

Figure 10 — Split-thickness graft being meshed



(2) Meshing allows the graft to be enlarged when it is stretched. It can then provide greater coverage at the recipient site. Epithelial tissue will grow in between the slits to eventually provide full coverage.

Figure 11 — Split-thickness graft being expanded



Information Sheet

(3) Meshers are available in several expansion ratios, such as 1.5, 3, 6, and 9:1

e. Care of grafts

(1) Grafts must not be allowed to dry out because that would destroy them.

(2) Grafts are placed in a basin with a few drops of warm saline solution unless otherwise requested by the surgeon.

f. Hemostasis is obtained during the operation using pressure, thrombin, or warm saline packs.

g. Several methods are used to secure the graft to the recipient site:

(1) Sutures or skin staples may be used on larger grafts.

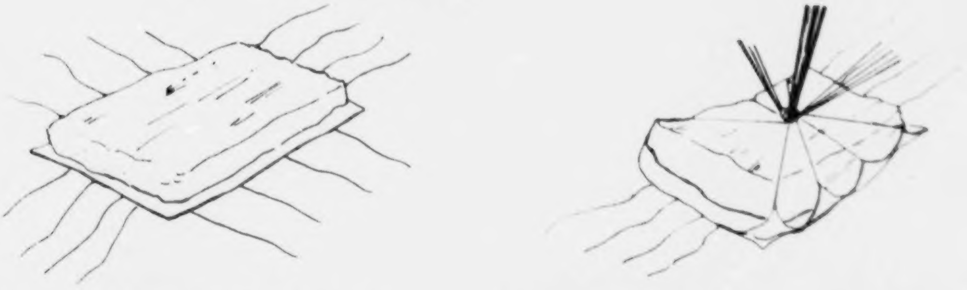
(2) Sterile adhesive strips (Steri-strips) may be used on smaller grafts.

h. Dressings over grafts vary according to surgeon preference.

(1) Donor site is usually covered with a fine mesh, medicated dressing.

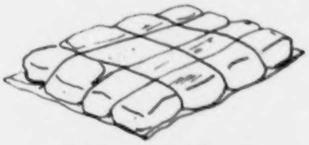
(2) The recipient site may have a stent dressing or other pressure dressing applied, or the surgeon may prefer to omit these so the graft can be more closely observed.

Figure 12 — Stent dressing



(a) A small amount of cotton or fluffed gauze is placed over the graft.

(b) The previously placed sutures are secured over the cotton/gauze.



(c) Stent is finished.

Information Sheet

   (3) A plaster cast is frequently applied to immobilize extremities during migration or transfer of pedicle grafts.

i. The following requirements must be met for grafts to heal or "take":

   (1) Meticulous aseptic technique must be followed.

   (2) Graft must remain in stabilized contact with the recipient site.

   (3) Bleeding and infection must be controlled.

16. Specialized instruments, equipment, and supplies for plastic surgery

Note: Many other specialized instruments could be added to this list. Microsurgery will also require other special instruments (microsurgical) as well as the microscope.

a. **Bone curettes** (Brun, Volkmann) — Used to scrape or remove bone tissue

b. **Caliper** (Castroviejo, Jameson) — Used for making precision measurements

c. **Dermabrader** — Used to remove acne scars, birthmarks, tatoos, and fine wrinkles on the epidermis

d. **Dermatome** (Brown, Hall, Padgett-Hood, Reese) — Used to cut split-thickness skin grafts

e. **Forceps, delicate tissue and dressing** (Adson, Brown, Hudson) — Used to grasp delicate tissue (many types)

f. **Implants and prostheses** (artificial/synthetic) — Used to replace diseased, injured, or missing body parts such as organs, limbs, joints, and tendons or to augment body parts such as breasts or chins

g. **Liposuction curettes and liposuction vacuum machine** — Used to remove fat and reshape various areas of the body

h. **Nerve retractor** (Cushing, Love, Sachs) — Used to retract vessels

i. **Osteotome** (Cottle, Sheehan) — Used to cut or shape bone

j. **Rasp** (Cottle, Fomon, Joseph, Lewis) — Used to reshape bone or cartilage

Information Sheet

k. **Scissors** — Used for cutting and dissecting; several types including:

   (1) Plastic surgery scissors
   (2) Iris scissors
   (3) Tenotomy scissors (Stevens)
   (4) Blepharoplasty scissors
   (5) Facelift scissors
   (6) Lower lateral scissors (Fomon)
   (7) Wire cutting scissors

l. **Skin hook (Cottle, Gillies, Joseph)** — Used to retract dermis and provide exposure to underlying structures; may have single or double prongs

m. **Tissue expanders** — Used to expand skin area prior to procedures such as skin grafting

Note: In addition to these specialized instruments, many basic instruments, equipment, and supplies will also be required for plastic surgery. These will vary depending on the anatomy and the type of procedure scheduled. For example, fine tissue forceps and small mosquito hemostatic forceps will be required on a blepharoplasty, but larger forceps and clamps will be needed for an abdominoplasty.

Plastic Surgery
Unit 9

Student Supplement 1—Review Anatomy of the Skin

Name ______________________ Date ______________

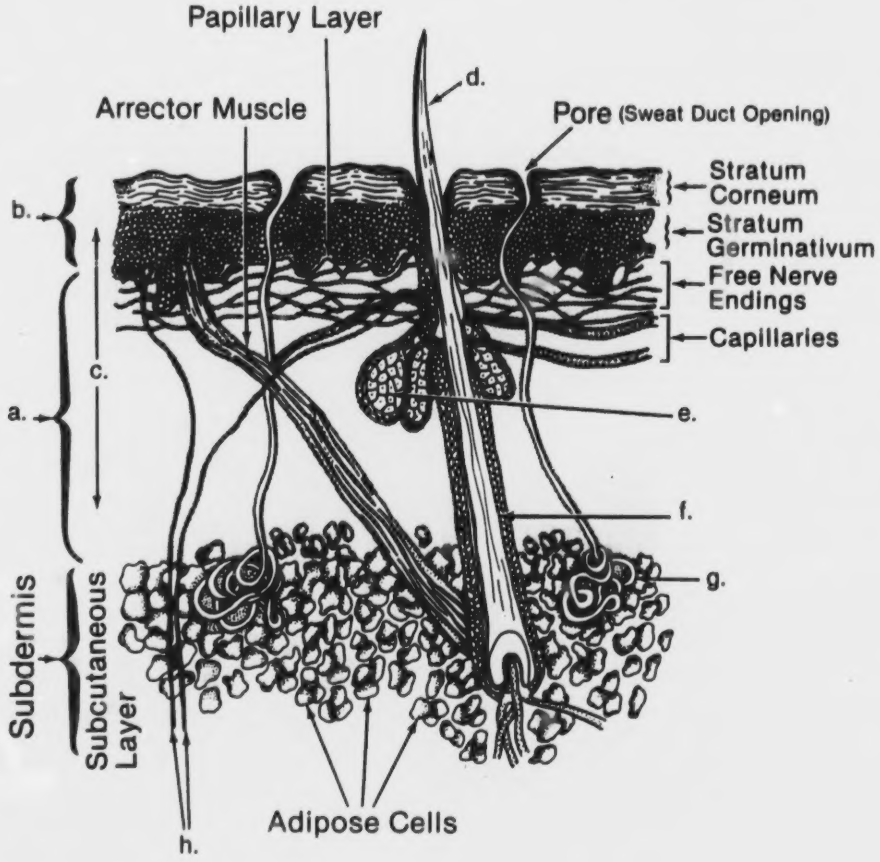
Directions: Identify the parts of the skin in the following illustration. Place your answers in the blanks provided.

a. ______________ e. ______________

b. ______________ f. ______________

c. ______________ g. ______________

d. ______________ h. ______________


Papillary Layer
Arrector Muscle
d.
Pore (Sweat Duct Opening)
Stratum Corneum
Stratum Germinativum
Free Nerve Endings
Capillaries
b.
c.
a.
e.
f.
g.
Subdermis
Subcutaneous Layer
Adipose Cells
h.

Plastic Surgery
Unit 9

Student Supplement 2—Review Basic Concepts of Plastic Surgery

Name ______________________________ Date ____________________

Directions: Select the best answer for each statement/question, and place your answers in the blanks provided.

______ 1. Abnormal smallness of the jaws is called:

a. Allothia
b. Micrognathia
c. Microtia
d. Prognathia

______ 2. All of the following instruments are commonly used to handle delicate tissue EXCEPT:

a. Allis clamps
b. Iris scissors
c. Mosquito clamps
d. Skin hooks

______ 3. Removal of redundant skin and periorbital fat of the upper and lower eyelids is called:

a. Blepharoplasty
b. Cheiloplasty
c. Mentoplasty
d. Rhytidectomy

______ 4. Closure of a cleft palate is called:

a. Cheiloplasty
b. Palatoplasty
c. Rhinoplasty
d. Septoplasty

______ 5. Which of the following burns would most likely result in a fourth degree burn?

a. Thermal
b. Chemical
c. Electrical
d. Radiation

Student Supplement 2

______ 6. Which of the following procedures would be done for more than aesthetic (cosmetic) reasons?

1)	Rhytidectomy	3)	Palatoplasty
2)	Skin graft	4)	Le Fort I

a. 1, 2, & 3
b. 1, 2, & 4
c. 1, 3, & 4
d. 2, 3, & 4

______ 7. Which of the following procedures involve ONLY the application of arch bars to reduce a maxillary fracture?

a. Le Fort I
b. Le Fort II
c. Le Fort III
d. Le Fort IV

______ 8. All of the following statements about plastic surgery are true EXCEPT:

a. Fine swaged sutures on cutting needles are frequently used.
b. A bipolar electrosurgical unit is often used.
c. A nerve stimulator may be used on certain procedures.
d. Most wounds are left undressed to improve postoperative care.

______ 9. The appropriate suture sizes for microsurgery would be:

a. 0 to 2-0
b. 2-0 to 8-0
c. 8-0 to 11-0
d. 11-0 to 20-0

______10. Tissue that is completely detached from the donor site and transplanted into the recipient site is called a:

a. Free graft
b. Heterograft
c. Pedicle flap
d. Tissue expansion flap

______11. A sunburn with primarily only blisters, pain, and peeling is most likely classified a ______-degree burn.

a. 1st
b. 2nd
c. 3rd
d. 4th

Student Supplement 2

______12. An area of the hand that has lost skin and subcutaneous tissue would require:

a. Split-thickness skin graft (S.T.S.G.)
b. Full-thickness skin graft (F.T.S.G.)
c. Either
d. Neither

______13. For a split-thickness skin graft on the abdominal area, all of the following instruments/supplies will be needed EXCEPT:

a. Drum dermatome
b. Oscillating-blade dermatome
c. Skin mesher
d. Stent dressing

______14. Skin from a human cadaver donor is called:

a. Autograft
b. Heterograft
c. Homograft
d. Xenograft

______15. Which of the following is LEAST needed when taking care of a burn patient in surgery for S.T.S.G. to the legs?

a. Aseptic technique
b. Dermatome
c. Microscope
d. Warmth

______16. For augmentation mammoplasty, all of the following are true EXCEPT:

a. The patient is placed in a modified Fowler's or supine position.
b. The incision may be made inframammary, axillary, or areolar.
c. The implant is placed inside the pectoralis muscle.
d. A pressure dressing and surgical bra or Ace wrap will be used.

______17. Any of the following instruments could be used to cut/shape bone EXCEPT:

a. Bone curettes
b. Dermatome
c. Osteotome
d. Rasp

Student Supplement 2

______18. Eschar is primarily removed during:

a. Abdominoplasty
b. Debridement
c. Dermabrasion
d. Liposuction

______19. All of the following techniques may be used with burn patients EXCEPT:

a. Hyperbaric oxygen chamber
b. Laminar air flow
c. Plastic isolator (bubble)
d. Very cool room temperature (65°-68°F)

______20. In regard to prepping for skin grafting procedures, all of the following statements are true EXCEPT:

a. Prepping is done very gently.
b. Prepping is performed for 10-15 minutes.
c. Colorless agents are used.
d. Donor and recipient sites are prepped separately.

Plastic Surgery
Unit 9

Assignment Sheet 1—Determine Needs for Given Plastic Surgery Cases

Name ____________________ Overall Rating ____________

Evaluation criteria	**Rating**
Answers are appropriate	______
Words are spelled correctly	______

Directions: Read each of the following cases, and fill in the blanks with the appropriate information required. Refer to the information sheets as needed.

Case A: You are assigned to scrub, set up, and pass on a split thickness skin graft to the right upper arm.

1. The type of anesthesia most likely to be used is ____________________
2. What areas will need to be prepped and left uncovered when drapes are applied? __
   ____
3. List two pieces of equipment that will be used to take the skin graft and to expand the area of the graft if needed:
   a. ____
   b. ____
4. The area where the graft will be taken from is called ____________________
5. What must the circulator remember when prepping? ____________________
6. How is the graft cared for prior to being placed on the donor site? ____________
   ____

Assignment Sheet 1

Case A continued

7. Draw a usable Mayo for this procedure.

Case B: A 23-year-old female is scheduled for a bilateral breast argumentation.

1. In what position will the patient be for this procedure? ____________________

2. What are the locations for possible breast incisions? ____________________

3. Where is the implant positioned? ____________________

4. What may be used to hold the dressing in place and add support for the patient? ____

   ____

5. The purpose of this procedure is to: ____________________

Assignment Sheet 1

Case B continued

6. Draw a usable Mayo for this procedure.

Orthopedic Surgery
Unit 10

Objective Sheet

Unit Objective

After completing this unit, the student should be able to describe types of fractures and common casts, determine needs for given orthopedic surgery cases, and position a pneumatic tourniquet cuff. The student should demonstrate these competencies by completing the assignment and job sheets and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to orthopedic surgery with their correct definitions.
2. State purpose of orthopedic surgery.
3. Complete statements concerning special features of orthopedic surgery.
4. Select true statements concerning positioning, prepping, and draping for orthopedic surgery.
5. List special equipment and supplies used in orthopedic surgery.
6. Define special abbreviations used in orthopedic surgery.
7. List preoperative diagnostic work that may be required for orthopedic surgery.
8. Complete statements concerning the use of pneumatic tourniquets.
9. Match specialized orthopedic instruments with the correct uses.
10. Select true statements concerning the use of air-powered instruments.
11. List types of orthopedic surgery.
12. Arrange in order the five stages of bone healing.
13. Distinguish among the classifications of fractures.
14. Identify types of fractures.
15. Describe methods for treating fractures.

Objective Sheet

16. Select from a list the correct requirements of casts.

17. Distinguish between types of casting materials.

18. Complete statements concerning characteristics of plaster casts.

19. Match types of common casts with the correct descriptions.

20. Describe possible treatment for common fracture sites.

21. Select true statements concerning characteristics of tendon and ligament repairs.

22. Complete statements concerning characteristics of arthroscopic surgery.

23. Complete statements concerning the procedure for arthroscopic surgery of the knee.

24. Select true statements concerning characteristics of reconstructive joint surgery.

25. Match procedures used in joint reconstructions with correct descriptions.

26. Describe common orthopedic procedures performed on selected parts of the body.

27. Determine needs for given orthopedic surgery cases. (Assignment Sheet 1)

28. Position a pneumatic tourniquet cuff. (Job Sheet 1)

Orthopedic Surgery
Unit 10

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Stages of Bone Healing (Objective 12)
   TM 2—Classifications of Fractures (Objective 13)
   TM 3—Types of Fractures (Objective 14)
   TM 4—Common Casts (Objective 19)
   TM 5—Tendon Repair (Objective 21)
   TM 6—Tendon Lengthening and Shortening (Objective 21)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Review "Instructions for Evaluating Student Performance," which follows the resources in this section of the unit. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

Suggested Activities

11. Discuss the student supplements. These could be used as homework assignments, daily practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

13. Discuss and demonstrate the job sheet. Make sure all required tools, equipment, and supplies are available. Review criteria for evaluation of this activity.

Evaluation

14. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

15. Make copies of the written test. Add or modify test items as needed.

16. Give written test.

17. Compile assignment sheet ratings, job sheet ratings, and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

18. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to orthopedic surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Obtain a skeleton or disarticulated model to use when describing particular surgical procedures and fractures pointing out bone processes, depressions, and articulations involved in that procedure.

3. Obtain x-rays from a local surgeon so students can view the types of fractures, internal fixations, and prosthetic implants while discussing each particular procedure. The students may also use these for their group assignments.

Suggested Activities

4. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

5. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in orthopedic surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

6. Make a display of the basic and specialized instruments that are required in orthopedic surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

7. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

8. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used in orthopedic surgery. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

9. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in orthopedic surgery. Have the speaker cover the following for each basic procedure:

    a. Diagnosis that brings the patient to surgery
    b. Preoperative work ups
    c. Highlights of the surgical procedure (including instruments and anatomical structures)
    d. Postoperative course

    Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

Suggested Activities

10. Have assigned students give oral reports on their research about orthopedic surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in orthopedic surgery. **Foundation skills, communication skills, personal management skills, influence skills**

    Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

11. Divide students into groups, and assign each group a different procedure commonly performed in orthopedic surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic setups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo setups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

12. Show videos of procedures common to orthopedic surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

13. Provide clinical orientation and guided clinical practice of orthopedic surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Adams, John Crawford. *Standard Orthopedic Operations*, 4th ed. New York: Churchill Livingston, Inc., 1992.

2. Association of Operating Room Nursing, Inc. *AORN Standards and Recommended Practices for Perioperative Nursing.* Denver: AORN, 1992.

3. Atkinson, Lucy Jo. *Berry and Kohn's Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby—Year Book, Inc., 1992.

Suggested Activities

4. Fairchild, Susan S. *Perioperative Nursing: Principles and Practices*. Boston: Jones and Bartlett Publishers International, Inc., 1993.

5. Fuller, Joanna R. *Surgical Technology Principles and Practice*, 2nd ed. Philadelphia: W. B. Saunders Company, 1986.

6. Goldman, Maxine A. *Pocket Guide to the Operating Room*. Philadelphia: F. A. Davis Company, 1988.

7. Meeker, Margaret Huth, and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: C. V. Mosby—Year Book, Inc., 1991.

Suggested Supplemental Resources

1. *The Back Operation*, 90 minutes, 1989. Covers the extensive procedure to correct scoliosis.

2. *The Implant*, 90 minutes, 1987. Takes viewers through each step of the process for a total hip replacement, including patient diagnosis, design and manufacture of the artificial hip, the actual implant, and rehabilitation. Also shows special air circulation system used in surgery and new parts made of superalloys and plastic used for implants.

3. *Implant II: Knee Replacement Surgery*, 90 minutes, 1989. Shows a state-of-the-art surgical procedure for replacing the knee.

   1 - 3 are available from:

   PBS Video
   1320 Braddock Place
   Alexandria, VA 22314-1698
   800-424-7963

4. *How a Broken Bone Heals*, 10-minutes. Discusses bone function, types of fractures, and the process of bone healing. Available from:

   Fairview Audio-Visuals
   17909 Groveland Avenue
   Cleveland, OH 44111
   216-476-7054

Suggested Activities

5. *Artificial Body Parts*, 26 minutes. Covers recent strides in medical engineering to replace missing limbs, wornout or diseased joints, and blood vessel grafts. Available from:

   Films for the Humanities and Sciences
   P.O. Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

6. *Endoscopic Carpal Tunnel Release: The Two-Portal Subligamentous Technique* (ACS-1762), 7 minutes, 1992. Shows endoscopic release of the transverse carpal ligament.

7. *Cementless Ceramic Hip Replacement—The Anterior Approach* (MS 0401), 21 minutes. Discusses the ceramic total hip and its advantages. Also covers the muscle preserving anterior approach.

8. *Sports Medicine: The Arthroscopy Patient* (DG-1643), 15 minutes, 1989. Illustrates the most common sports related injuries and the use of arthroscopy as surgical intervention.

9. *Powered Surgical Instruments: The Perioperative Challenge* (DG-1641), 15 minutes, 1989. Reviews the basic types and parts of powered surgical instruments, as well as their cleaning, storing, sterilization, and surgical presentation.

10. *Care of the Total Joint Patient* (DG-1516), 21 minutes, 1985. Covers the special perioperative care required for the total joint replacement patient.

    6 - 10 are available from:

    Davis & Geck Video Library
    c/o Cine-Med
    127 Main Street North
    P.O. Box 745
    Woodbury, CT 06798
    800-633-0004 or 203-263-0080

11. *Nursing Care of Patients with Casts: Part 1*, 28 minutes. Covers the purpose of casts, common types, casting materials, and how they are applied and removed. Describes potential problems.

Suggested Activities

12. *Traction: Checks and Balances*, 28 minutes. Depicts the various forms of traction, including manual traction, skin traction, and skeletal traction. Details the purposes of traction and commonly applied forms of traction.

    11 and 12 are available from:

    AJN Video Library
    c/0 West Glen
    1430 Broadway
    New York, NY 10018
    800-CALL-AJN

Instructions for Evaluating Student Performance

When the student is ready to perform a specific task, obtain a copy of the job sheet which may be found in either the teacher or student edition. Then observe the student performing the procedure.

Process evaluation—Place a mark in the box to the left of each designated checkpoint if the student has satisfactorily achieved the step(s) for each checkpoint area. If the student is unable to correctly complete the procedure, have the student review the materials and try again.

Product evaluation—Once the student has satisfactorily completed the procedure, rate the student product (outcome) using the criteria which have been provided as part of the job sheet. If the student's product is unacceptable, have the student review the materials and submit another product for evaluation.

Sample performance evaluation keys have been provided below. Many other keys are available. Select one rating (grading scale) which best fits your program needs.

Option A

4 - Skilled—Can perform job with no additional training.
3 - Moderately skilled—Has performed job during training program; limited additional training may be required.
2 - Limited skill—Has performed job during training program; additional training is required to develop skill.
1 - Unskilled—Is familiar with process, but is unable to perform job.

Option B

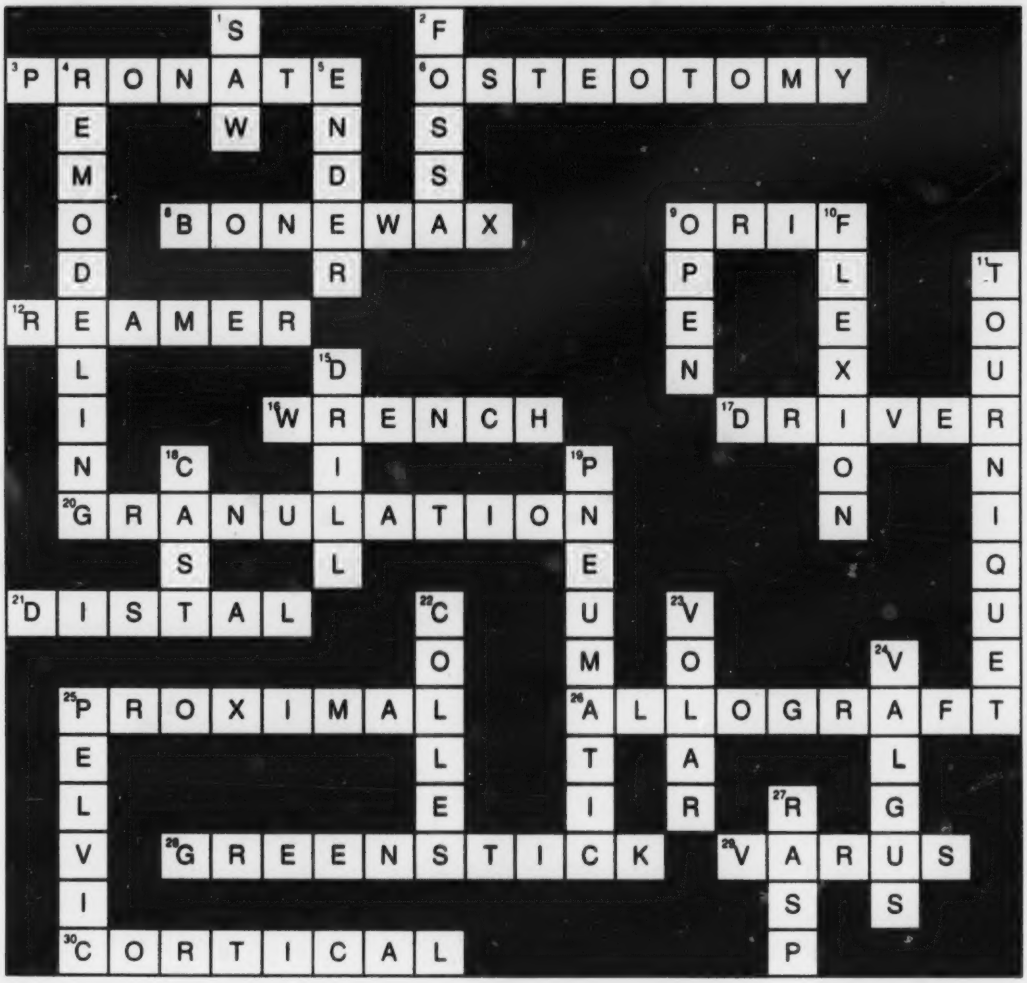
Yes—Can perform job with no additional training.

No—Is unable to perform job satisfactorily.

Orthopedic Surgery
Unit 10

Answers to Student Supplements

Student Supplement 1


1 SAW
2 FOSS
3 PRONATE
4 REMODELING
5 ENDER
6 OSTEOTOMY
8 BONEWAX
9 ORIF
9 OPEN
10 FLEXION
11 TOURNIQUET
12 REAMER
15 DRILL
16 WRENCH
17 DRIVER
18 CAST
19 PNEUMATIC
20 GRANULATION
21 DISTAL
22 COLLES
23 VOLAR
24 VALGUS
25 PROXIMAL
25 PELVIC
26 ALLOGRAFT
27 RASP
28 GREENSTICK
29 VARUS
30 CORTICAL

Answers to Student Supplements

Student Supplement 2

a. Cancellous bone
b. Compact bone
c. Periosteum
d. Endosteum
e. Medullary cavity
f. Epiphysis
g. Diaphysis
h. Articular cartilage

Student Supplement 3

a. Clavicle
b. Scapula
c. Humerus
d. Radius
e. Ulna
f. Carpals
g. Metacarpals
h. Phalanges
i. Os coxae or os innominatum
j. Femur
k. Patella
l. Tibia
m. Fibula
n. Tarsals
o. Metatarsals
p. Phalanges

Orthopedic Surgery
Unit 10

Answers to Assignment Sheets

Note: Procedures (prepping, draping, etc.) for each given case will vary. Instructor should evaluate answers dependent upon regional differences and surgeon's preference.

Case A: 12-year-old male; fracture of right radius

1. Spiral fracture
2. Closed reduction external fixation right radius
3. General
4. Plaster cast (long arm)
5. Any two of the following:
    a. 2″ or 4″ stockinette
    b. 4″ webril
    c. 4″ plaster rolls
    d. Bucket with cool water
6. Any two of the following:
    a. X-rays should be in the room because of patient's age and possible pain.
    b. Keep environment quiet; use a calm voice with simple explanations.
    c. Keep room warm.
    d. Use pillows for elevation of extremity.

Case B: 26-year-old female; fracture of right tibia

1. Comminuted fracture
2. Open reduction internal fixation right tibia
3. Supine
4. General

Answers to Assignment Sheet 1

5. Fracture site should be supported by another person, tourniquet should be positioned high on the thigh covered with a plastic adhesive drape, prep should extend from above the knee and include the foot and toes beginning at the fracture site, iodophor solution or surgeon's preference, and prep should be for 10 minutes.

6. Leg is placed in a stockinette and elevated, large sheet (or half sheet) is placed over end of table, large sheet is placed above thigh covering top of patient, split sheet is draped around thigh (clipped and/or adhesive strips used to hold in place), Esmarch bandage used to exsanguinate the extremity, and tourniquet inflated.

7. Compression plates and screws and/or intramedullary nails, cast and/or splint

8. Any two of the following: Tourniquet with webril, compressed air, antibiotic irrigation, casting materials, image intensifier may be requested by surgeon

9. Any three of the following: Bone clamps, power drill, drill bits, compression plate and screw set with related instrumentation, and/or intramedullary reamer, nail set with related instrumentation, bone screw set, depth gauge

10. Any three of the following:

    a. X-rays should be in the room.
    b. Surgeon may request a fracture table.
    c. Extra pillows and blankets are required for support and protection.
    d. Patient may need to be anesthetized in hospital bed before moving to the O.R. table.
    e. Movement into and out of the room should be kept to a minimum.
    f. Patient's chart should be checked for drug allergies.
    g. Patient should be protected by a lead shield if the image intensifier is being used.

Case C: 73-year-old female; fracture of left femoral neck

1. Open reduction internal fixation left hip

2. Fracture table—Chick, Stryker

3. Lateral or supine depending on fracture

4. General. However, if other physical conditions prevail, a regional block may be used (spinal or epidural).

Answers to Assignment Sheet 1

5. A sterile plastic adhesive drape may be used to isolate the perineal area before the prep. Prep should extend from the nipple line to the toes beginning at the greater trochanter. Iodophor solution or surgeon's preference should be used. Prep should be for 10 minutes.

6. The leg is abducted and the foot grasped in a sterile towel (which is clipped) by the circulator and placed in a stockinette which extends over the thigh. A split sheet is placed under the thigh and wrapped superior to the lilac crest. Towels are secured around the site of the incision. A large sheet (or half sheet) is placed proximal to the inferior costal margin. An iodophor impregnated adhesive drape may be placed over the incision site. Draping procedure for a fracture table will depend on the type of table used.

7. Pins of surgeon's choice such as Knowles or Deyerle, cannulated screws, screws with plate combination

8. Any two of the following: Fracture table, compressed air, antibiotic irrigation, image intensifier, lead aprons and shields

9. Any three of the following: Bone clamps, hip retractors, guide wires with reamer, power drill, drill bits, surgeon pin preference with related instrumentation, cannulated screws and/or plate combination with related instrumentation, bone screw set, depth gauge

10. Any three of the following:

    a. X-rays should be in the room.
    b. Extra pillows and blankets are required for support and protection.
    c. Patient will need to be anesthetized in hospital bed before moving to the O.R. table.
    d. Movement into and out of the room should be kept to a minimum.
    e. Patient's chart should be checked for drug allergies.
    f. Patient should be protected by a lead shield when the image intensifier is being used.

Orthopedic Surgery
Unit 10

Answers to Written Test

1. a. 13
b. 6
c. 19
d. 9
e. 8
f. 14
g. 10
h. 5
i. 7
j. 20
k. 4
l. 3
m. 31
n. 33
o. 25
p. 35
q. 39
r. 28
s. 36
t. 22
u. 45
v. 21
w. 40
x. 30
y. 38

2. To preserve and restore functions to the skeletal system, its articulations, and associated structures

3. a. Osteomyelitis
b. Ten (10)
c. Plaster dust
d. Decontaminated
e. Laminar
f. Any one: General, regional, or local
g. Cutting edges
h. Nonabsorbable
i. Absorbable
j. Any one: Cautery, bone wax, or absorbable gelatine sponges

4. a. F
b. T
c. T
d. T
e. F
f. F
g. F
h. T
i. F
j. F
k. T

Answers to Written Test

5. Any six of the following:

   a. Operating microscope
   b. Power-driven instruments
   c. Nerve stimulator
   d. Fixation devices
   e. Prosthetic implants
   f. Electrical bone stimulator
   g. Bone cement
   h. Casts
   i. Braces and immobilizers
   j. Tourniquets
   k. Conventional x-ray or image intensifiers
   l. Traction devices

6. a. BE — Below elbow
   b. AK — Above knee
   c. ORIF — Open reduction, internal fixation
   d. CRIF — Closed reduction, internal fixation

7. Any three of the following:

   a. X-rays
   b. Computerized tomography
   c. Magnetic resonance imaging
   d. Bone densitometers
   e. Arthroscopy

8. a. Extremities
   b. Nonsterile
   c. After
   d. May not
   e. Circulator
   f. 300
   g. 2 hours

9. a. 3
   b. 8
   c. 9
   d. 2
   e. 7
   f. 1
   g. 5
   h. 4
   i. 14
   j. 11
   k. 12

Answers to Written Test

10. a. F
    b. F
    c. F
    d. T
    e. T
    f. T
    g. F
    h. F

11. Any three of the following:

    a. Repair and management of fractures
    b. Repair/reconstruction of tendons and ligaments
    c. Diagnostic examinations of joints
    d. Revision/reconstruction of joints

12. a. 3
    b. 2
    c. 1
    d. 5
    e. 4

13. a. P
    b. T
    c. O
    d. C
    e. O
    f. T

14. a. Greenstick
    b. Transverse
    c. Impacted
    d. Multiple
    e. Spiral
    f. Comminuted

15. Any two of the following:

    a. Closed reduction — Surgeon reduces the fracture manually without making an incision to expose the fracture site.
    b. Open reduction — Surgeon reduces the fracture after making an incision to expose the fracture site
    c. External fixation — Surgeon uses external devices that hold bone fragments in place from the outside while healing occurs
    d. Internal fixation — Surgeon uses internal devices that hold bone fragments in place from the inside while healing occurs

Answers to Written Test

16. c, e

17. a, d

18. a. One of the following: soft roll, sheet wadding, or cotton bandaging such as Webril
    b. Tepid or cool water
    c. 2" - 8"
    d. Heating up
    e. Palm
    f. 4-5
    g. Cast spreaders

19. a. 7
    b. 3
    c. 5
    d. 1
    e. 6
    f. 4
    g. 2
    h. 8

20. a. Any one of the following:

    (1) Reduction is usually accomplished by closed manipulation with immobilization.
    (2) ORIF is usually accomplished with a nail, rod, or compression plate.
    (3) When fracture occurs distally (supracondylar, epicondylar, intercondylar), closed reduction is rarely successful. Internal fixation may be accomplished with screws, wires, or pins.

    b. Any one of the following:

    (1) Occur frequently in children and are usually treated by external fixation; seldom need internal fixation
    (2) When internal fixation is indicated, intramedullary pins or compression plates are frequently used for one or both bones.

    c. Any one of the following:

    (1) Conservative treatment includes skeletal traction for 3-6 weeks followed by cast immobilization.
    (2) Surgical treatment includes closed or open intramedullary nailing.

    d. Open reduction using pins, malleolar screws, or plates and screws

Answers to Written Test

21. a. T
    b. T
    c. F
    d. F
    e. F
    f. T

22. a. Ligamentous
    b. Any one of the following: Knee, shoulder, elbow, wrist, or ankle
    c. Any one of the following: Lower risk of infection, no disruption of extensor mechanisms, decreased operative pain, and earlier rehabilitation
    d. Room
    e. Swelling

23. a. Elevated
    b. In a leg holder
    c. Trocar
    d. Normal saline solution
    g. Irrigated
    h. Closed
    i. Compression

24. a. F
    b. T
    c. F
    d. T
    e. F
    f. T
    g. T

25. a. 3
    b. 5
    c. 1
    d. 2

26. Procedures and descriptions should include one from **each** of the following:

    a. Hand

    (1) Tendon grafts — Replacement of primarily flexor tendons lost to laceration or failed tendon repairs
    (2) Peripheral nerve repair — Correction of loss of motor function or loss of sensation
    (3) Palmar fasciectomy — Partial or total excision of the palmar fascia to treat Dupuytren's contracture which is a progressive disease causing the palmar fascia to constrict and eventually preventing the fingers from full extension

Answers to Written Test

(4) Carpal tunnel release — Incision of the transverse carpal ligament to relieve the compression of the median nerve within the carpal canal at the wrist

(5) Metacarpal arthroplasty — Total replacement of the metacarpal is achieved by resection of the metacarpal head and proximal phalanx with replacement by silicone rubber implants which have two stems and a hinge joint.

b. Shoulder

(1) Bristow procedure — Detachment of the coracoid process and the attached muscles and insertion onto the neck of the glenoid cavity, where they are held with a screw; performed for recurrent dislocation of the shoulder

(2) Repair of an AC separation — Insertion of a Bosworth coracoclavicular screw through the clavicle and into the coracoid process to reduce the acromioclavicular separation and to stabilize the joint

(3) Rotator cuff repair — Detachment of the muscles from the scapula and clavicle to repair torn tendons from the muscles of the humerus. Small tears are repaired with heavy nonabsorbable suture; large tears are repaired by attaching the tendons through drill holes using cotton or synthetic sutures.

(4) Total shoulder arthroplasty — Total replacement of the shoulder is achieved by resection of the humeral head and resurfacing the glenoid cavity and the articular surface of the scapula and implantation of a metal humeral head and plastic glenoid socket.

c. Knee

(1) Patellectomy — Removal of the entire patella

(2) Repair of collateral or cruciate ligament tears — Reconstruction of ligaments with nonabsorbable sutures, wires, staples, and grafts

(3) Baker's cyst excision — Removal of a cyst from the popliteal fossa

(4) Meniscectomy — Removal of the medial or lateral meniscus; usually performed by arthroscopy

(5) Total knee arthroplasty — Total replacement of the knee joint with a distal femoral component articulating with a proximal tibial component

Answers to Written Test

d. Ankle and/or foot

(1) Triple arthrodesis — Fusion of the talocalcaneal, talonavicular, and calcaneocuboid joints performed by using bone graft, compression plates, and/or bone staples.
(2) Total ankle arthroplasty — Total replacement of the ankle joint with a distal tibial component articulating with a talus component
(3) Bunionectomy — Removal of exostosis and attempt to realign the great toe by removal of bone, transfer of tendons, and osteotomy of the first metatarsal shaft
(4) Correction of hammer toe deformity — Correction is made by incising the long extensor tendon to the toes and fusing the middle joint
(5) Total metatarsal arthroplasty — Total replacement of the metatarsal joint is achieved by resection of the proximal phalanx and exostosis of the metatarsal head with replacement by silastic implants

e. Vertebral column

(1) Laminectomy — Removal of bony fragments or an intervertebral disc exerting pressure on the spinal cord or nerve roots
(2) Spinal fusion — Fusion of vertebral bodies to stabilize the vertebral motor unit with bone graft from iliac crest
(3) Discectomy — Removal of the nucleus pulposus or the ruptured portion of the annulus fibrosis

Orthopedic Surgery
Unit 10

Written Test

Name ______________________________ Date _______________ Score ______

1. Match the terms on the right with the correct definitions.

Note: The definitions on the page match the terms on this page only.

______a. Spongy bone found at the ends of long bones and within flat bones; contains red marrow

______b. Surgical incision of a joint

______c. Shaft of a long bone

______d. Wasting away or diminution in the size of a part

______e. Joint; place of union or junction between two or more bones

______f. Elastic substance attached to articular bone surfaces; forms certain parts of the skeleton

______g. Individual part of the skeleton; osseous tissue

______h. Inflammation of a joint

______i. Special type of dense connective tissue which covers bone surfaces in a joint

______j. Displacement of a part of a joint

______k. Act of drawing a part toward the midline

______l. Point where the clavicle joins the acromion process (lateral extension) of the scapula

1. Abduction
2. Acetabulum
3. Acromioclavicular joint
4. Adduction
5. Arthritis
6. Arthrotomy
7. Articular cartilage
8. Articulation
9. Atrophy
10. Bone
11. Bone marrow
12. Bursa
13. Cancellous bone
14. Cartilage
15. Compact bone
16. Condyle
17. Cortical bone
18. Curvature
19. Diaphysis
20. Dislocation

Written Test

Note: The definitions on this page match the terms on this page only.

______m. Break in the bone; loss of continuity of a bone

______n. Fibrous sheath that encloses articular bone surfaces

______o. Bony growth that arises from the surface of a bone

______p. Band of exceptionally strong, flexible connective tissue which joins articular bone surfaces

______q. Original and development of bone tissue; ossification

______r. Natural opening in bone through which nerves, vessels, and other structures pass

______s. Rounded bony process, such as the protuberance on each side of the ankle

______t. Abnormal tissue growth and development

______u. Bent outward; away from the midline of the body distal to joint or point described

______v. Situated or directed farther away or remote from the area under consideration

______w. Inflammation of a bone caused by a pyogenic organism; may remain localized or may spread through the bone

______x. Shallow depression in a bone

______y. Failure of the ends of a fractured bone to unite; false union, pseudoarthrosis

21. Distal
22. Dysplasia
23. Epiphysis
24. Eversion
25. Exostosis
26. Extension
27. Flexion
28. Foramen
29. Foramen magnum
30. Fossa
31. Fracture
32. Inversion
33. Joint capsule
34. Lateral
35. Ligament
36. Malleolus
37. Malunion
38. Non-union
39. Osteogenesis
40. Osteomyelitis
41. Osteoporosis
42. Periosteum
43. Proximal
44. Tendon
45. Valgus
46. Varus

Written Test

2. State the basic purpose of orthopedic surgery.

____

____

3. Complete the following statements concerning special features of orthopedic surgery by filling in the blanks with the correct words.

   a. Aseptic technique is critical in orthopedic surgery since soft tissue infections may lead to ______________________ .

   b. A ______-minute surgical scrub is usually required for each orthopedic procedure.

   c. Cast rooms separated from operating rooms are used to reduce the presence of ______________________ in the operating room.

   d. Patients' beds and frames (traction) should be ______________________ in the preanesthesia care unit before entering the operating room.

   e. ______________________ airflow systems are used in some hospitals to reduce airborne microorganisms in an effort to prevent infection.

   f. Anesthesia may be ______________________ .

   g. Although many orthopedic instruments are big and heavy, they must be handled carefully, especially their ______________________ .

   h. ______________________ sutures are generally used on ligaments, tendons, and muscles.

   I. ______________________ sutures are used on the periosteum.

   j. One hemostatic aid that may be used is ______________________ .

4. Select true statements concerning positioning, prepping, and draping by placing a "T" or "F" next to the true or false statements.

   ______a. Positioning of the orthopedic patient should be directed by the circulator.

   ______b. The operating room staff should know the meaning of directional terms for assisting in positioning the patient.

Written Test

______c. Orthopedic tables such as Chick and Stryker are commonly used for operations requiring traction, image intensification (C-arm), intraoperative x-rays, and cast applications.

______d. When shaving is necessary, it should be done as close to the time of surgery as possible.

______e. Hair should always be removed in the operating room.

______f. When prepping an extremity, the tourniquet should be applied last (after prepping).

______g. Extremities must never be elevated during the surgical prep.

______h. The prep should extend from one joint above to one joint below the operative site.

______i. Orthopedic surgical drapes are very light so the surgical team must take extra precautions to prevent contamination of the drapes.

______j. Split sheets are used to conform snugly around the head.

______k. Iodophor-impregnated adhesive drapes are frequently used to lower infection rates.

5. List six pieces of special equipment and supplies used in orthopedic surgery.

a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________

f. ______________________________

Written Test

6. Define the following abbreviations used in orthopedic surgery.

   a. BE —

   b. AK —

   c. ORIF —

   d. CRIF —

7. List three types of preoperative diagnostic work that may be required for orthopedic surgery.

   a.

   b.

   c.

8. Complete the following statements concerning the use of pneumatic tourniquets by circling the correct answers.

   a. The pneumatic tourniquet is used on (the abdomen, extremities) when a bloodless wound site is necessary.

   b. The tourniquet is (sterile, nonsterile).

   c. The tourniquet cuff is positioned (before, after) the site is wrapped.

   d. The cuff (may, may not) be placed directly at the knee and elbow.

   e. The (scrub person, circulator) will inflate the cuff.

   f. (300, 450, 600) mm Hg is commonly used for an upper extremity.

   g. The maximum time that a tourniquet may be left in place is (30 minutes, 1 hour, 2 hours).

Written Test

9. Match the specialized orthopedic instruments on the right with the correct uses.

______a. Used to insert or remove implants, such as nails, staples, and nail-plate combinations

______b. Used to smooth rough bone surface or to hollow out medullary cavity for prosthesis

______c. Used to form a hollow area in a bone

______d. Used to cut pins, wires, or wire sutures

______e. Cutting instruments used to trim bone and to remove bone which may be used as a graft

______f. Used to grasp bone fragments and hold while stabilizing devices are installed

______g. Larger and heavier than conventional scalpel blades in order to cut heavier tissue such as cartilage

______h. Used to free periosteum from bone or for fine bone dissection

______i. Used to insert plates, screws, and nails

______j. Cutting instruments similar to scissors but heavy enough to cut through bone; take "bites" of bone

______k. Used to cut apart or cut out portions of bone; may be power-driven or manual

1. Bone clamps, bone hooks
2. Cutters
3. Drivers, impactors, extractors
4. Elevators
5. Knives
6. Measuring devices
7. Osteotomes, curettes, gouges, chisels
8. Rasps, files
9. Reamers
10. Retractors
11. Rongeurs
12. Saws, drills
13. Screwdrivers
14. Wrenches

Written Test

10. Select true statements concerning use of air-powered instruments by placing a "T" or "F" next to the true or false statements.

______a. Air-powered instruments are used for desiccation of tissues and coagulation of blood vessels.

______b. These high-speed instruments lengthen the operating time over manually-driven instruments.

______c. Oxygen is used to power these instruments.

______d. Many attachments are available.

______e. Attachments must be completely seated and locked before power is activated.

______f. The safety should be in place when not in use.

______g. Clean these instruments in ultrasonic cleaners as needed.

______h. Sterilize these instruments in liquid chemical sterilants.

11. List three types of orthopedic surgery.

a. ______________________________

b. ______________________________

c. ______________________________

12. Arrange in order the five stages of bone healing by placing the correct sequence numbers (1-5) in the appropriate blanks.

______a. Callus formation

______b. Granulation

______c. Hemorrhage

______d. Remodeling

______e. Consolidation

625

Written Test

13. Distinguish among the classifications of fractures by placing the following letters next to the correct descriptions:

- C — Closed
- O — Open
- P — Pathologic
- T — Traumatic

______a. Caused by demineralization of bone from osteoporosis, aging process, or primary or metastatic malignant bone disease

______b. Occurs when bone is fatigued by overwork or has inadequate muscle support during exertion

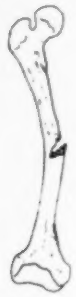
______c. Bone fragments protrude through adjacent tissues and skin

______d. Simple fracture in which bone fragments do not protrude through adjacent tissue to puncture skin

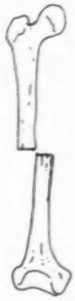
______e. May be referred to as a compound fracture

______f. Caused by impact, forced twisting, or bending of bone(s)

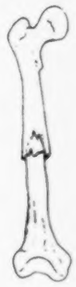
14. Identify the following types of fractures by placing the correct answers in the blanks provided.



a. ____________

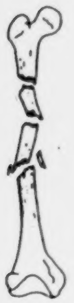


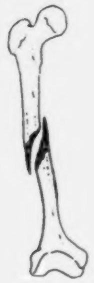
b. ____________

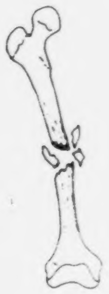


c. ____________

Written Test







d. ____________ e. ____________ f. ____________

15. Describe two methods for treating fractures.

a. ____

____

b. ____

____

16. Select from the following list the correct requirements of casts by placing an "X" in the appropriate blanks.

______a. Must apply traction forces to fracture

______b. Must be tight

______c. Must not have pressure areas

______d. Must be as heavy as possible

______e. Must be comfortable with no binding or chafing

Written Test

17. Distinguish between types of casting materials by placing an "X" next to the description(s) of plaster of paris.

______a. Gypsum or anhydrous calcium sulfate that sets when water is added

______b. Materials usually made of fiberglass that are applied according to the manufacturer's instructions

______c. Lightweight, waterproof, and easy to apply

______d. Least expensive material available and easy to apply

18. Complete the following statements concerning characteristics of plaster casts by filling in the blanks with the correct answers.

a. The body part to be immobilized is first covered with stockinette, followed by __________________ prior to the application of the cast.

b. The procedure for applying casts is as follows:

(1) Plaster rolls or strips are placed in a bucket of __________________ until air bubbles no longer rise from the roll to rehydrate the plaster.

(2) Excess water is squeezed from plaster roll to prevent dripping by crimping edges gently or by pushing both ends toward middle.

(3) Plaster rolls or strips are applied to body part and allowed to harden.

c. Plaster casts are available in rolls and strips __________________ wide.

d. An exothermic chemical reaction occurs as plaster begins to harden which involves a __________________ of the material.

e. Limbs are supported while the plaster is hardening on pillows or the __________________ of the hand.

f. Plaster casts require various times to harden depending on the material used; fast setting takes __________________ minutes to harden.

g. Casts are commonly removed with electric cast saws or plaster knives and scissors with the aid of __________________ for prying open the cast.

Written Test

19. Match types of common casts on the right with the correct descriptions.

______a. Applied from below the knee to the toes primarily for fractures of the foot and ankle

______b. Applied from the groin to the toes for distal fractures of the femur and fractures of the tibia and fibula

______c. Applied to the trunk and one or both legs for fractures of the femur and following some hip operations

______d. Applied to the trunk, arm, and hand for fractures of the humerus or following procedures on the shoulder or humerus when complete immobilization is required

______e. Applied from below the elbow to the knuckles for wrist fractures

______f. Applied from above the elbow to the knuckles for fractures of the elbow or the forearm

______g. Applied to the trunk from the axillae to hips for immobilization of the vertebrae

______h. Applied to the trunk from the hips to or including the lower portion of the head for fractures of the cervical or upper thoracic vertebrae

1. Shoulder spica
2. Body jacket/cast
3. Long leg cast
4. Long arm cast
5. Hip spica
6. Short arm cast
7. Short leg cast
8. Minerva jacket
9. Femoral cast brace
10. Cylinder cast

20. Describe one possible treatment for each of the following common fracture sites.

a. Fractures of the humerus ______________________________

____

____

b. Fractures of the radius and ulna ______________________________

____

____

c. Fractures of the femoral shaft ______________________________

____

____

d. Fractures of the ankle; medial and posterior malleolus ______________

____

____

21. Select true statements concerning characteristics of tendon and ligament repairs by placing a "T" or "F" next to the true or false statements.

______a. Repairs are performed for severed, torn, or ruptured tendons and ligaments.

______b. Repairs are intricate procedures which involve a reapproximation and suturing of the severed ends.

______c. Tendons may be shortened or grafted but cannot be lengthened.

______d. Artificial tendons made of stainless steel are available when the patient's tendons cannot be repaired.

______e. Absorbable suture is commonly used for tendon repairs.

______f. Tendon repairs on the hand are commonly performed by plastic surgeons.

22. Complete statements concerning characteristics of arthroscopic surgery by filling in the blanks with the correct answers.

a. Arthroscopic surgery is performed for diagnosis and/or definitive treatment of meniscal, articular, cartilage, and __________________ defects.

b. It may be performed on the __________________ .

c. One advantage is ______________________________________.

Written Test

d. Sterile irrigation solutions (normal saline or Ringers) are used at ________________ temperature to extend the joint.

e. Compression dressings are used to prevent ________________ .

23. Complete the following statements concerning the procedure for arthroscopic surgery of the knee by circling the correct answers.

a. Patient is placed in supine position with a pneumatic tourniquet placed high about the thigh on affected leg. With the leg (lying flat on the table, elevated), the pneumatic tourniquet is inflated.

b. Affected leg is placed (on a leg board, in a leg holder) in a routine fashion. The knee is then prepped and draped so that the knee is exposed and the remainder of the leg is free in a sterile fashion.

c. Surgeon introduces the arthroscope cannula and (trocar, syringe) into the anterolateral aspect through a separate portal.

d. Knee is inflated with (normal saline solution, carbon dioxide gas) and an outflow catheter is placed in an upper, outer portal.

e. Arthroscopic examination is performed by attaching the videocamera or by looking through the scope with the eye.

f. Surgeon performs additional procedure, if necessary, based on arthroscopic examination.

g. Joint is (insufflated, irrigated) removing all bits and pieces.

h. Surgeon removes all tubes from the knee, and the wounds are (left open, closed).

i. (Compression, Standard) dressing is applied, and pneumatic tourniquet is deflated and removed.

24. Select true statements concerning characteristics of reconstructive joint surgery by placing a "T" or "F" next to the true or false statements.

______a. Reconstructive joint surgery is usually performed to treat/eradicate cancer in a joint.

______b. Correct alignment and fit of component parts are critical to their function.

Written Test

______c. If joints are to be reconstructed, they must be reconstructed totally.

______d. Bones on both sides of the joint may be replaced or resurfaced.

______e. Component parts are usually made of glass or ceramics.

______f. Component parts may be cemented or non-cemented.

______g. Special precautions are usually followed during reconstructive joint surgery to prevent infection.

25. Match procedures used in joint reconstructions listed on the right with correct descriptions.

______a. Direct visualization into a joint through an endoscope for diagnosing and treating joint defects

______b. Moving the articular surface of the bone back into proper alignment with the joint capsule primarily using closed reduction, with or without traction; internal fixation may be necessary if closed reduction fails to stabilize the joint and prevent recurrence

______c. Surgical fixation or fusion of a joint; primarily performed following resection of recurrent benign or malignant lesions of the bones and joint and for rheumatoid arthritis

______d. Incision into a joint to biopsy the synovium or cartilage, to remove bone or cartilage fragments, or to repair a defect in the synovium or joint capsule

1. Arthrodesis
2. Arthrotomy
3. Arthroscopy
4. Arthroplasty
5. Repair of joint dislocations

Written Test

26. Describe at least one common orthopedic procedure performed on each of the following parts of the body.

    a. Hand ____________________

    ____

    ____

    b. Shoulder ____________________

    ____

    ____

    c. Knee ____________________

    ____

    ____

    d. Ankle and/or foot ____________________

    ____

    ____

    e. Vertebral column ____________________

    ____

    ____

*Permission to duplicate this test is granted.

Orthopedic Surgery
Unit 10

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Orthopedic Surgery Cases Rating _____

Comments: ____

____

Job Sheet 1—Position a Pneumatic Tourniquet Cuff Rating _____

Comments: ____

____

Written Test Scores

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

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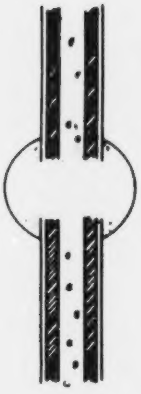
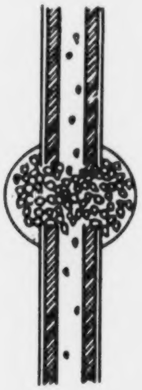
*Permission to duplicate this form is granted.

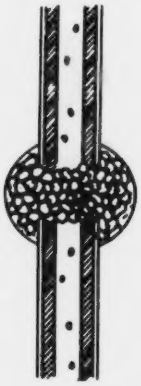
Stages of Bone Healing



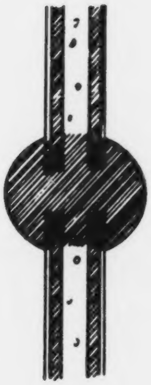
a. Hemorrhage



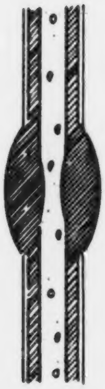
b. Granulation



c. Callus Formation

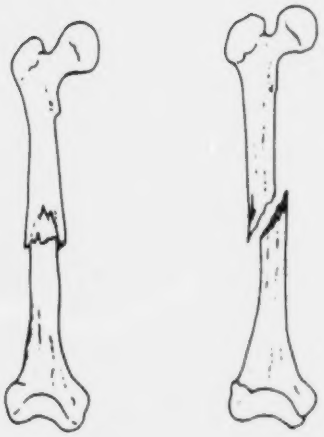


d. Consolidation

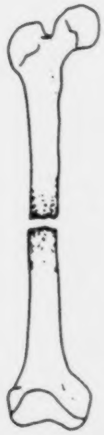


e. Remodeling

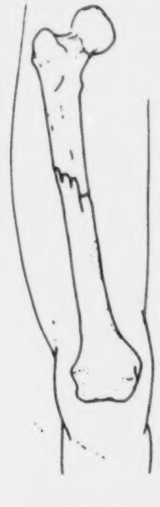
Classifications of Fractures



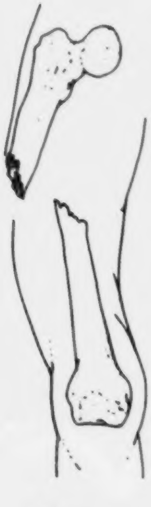
Traumatic



Pathologic

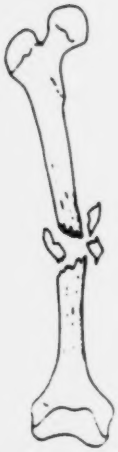


Closed

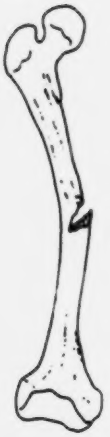


Open

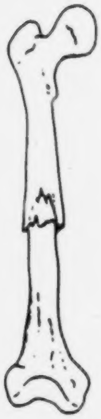
Types of Fractures



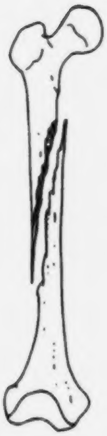
Comminuted



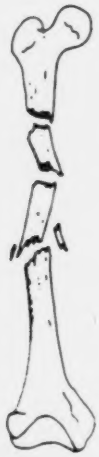
Greenstick



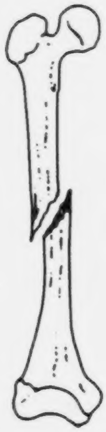
Impacted



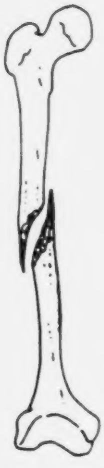
Longitudinal



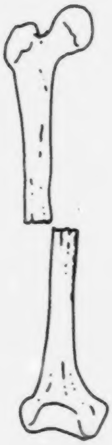
Multiple



Oblique

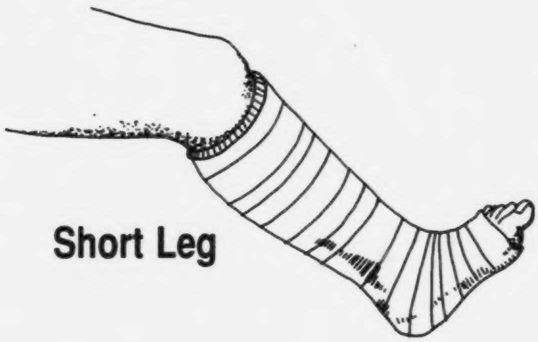


Spiral

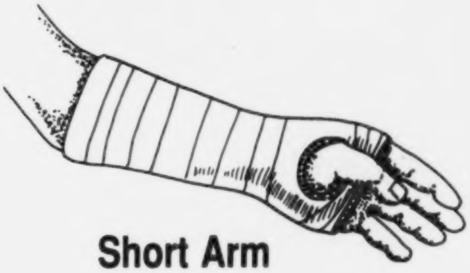


Transverse

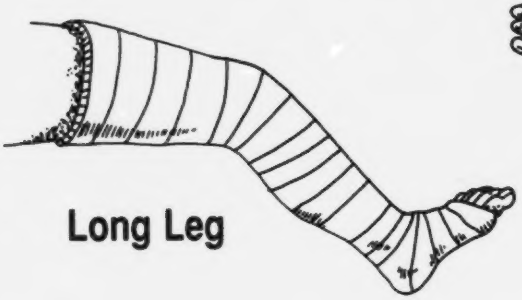
Common Casts



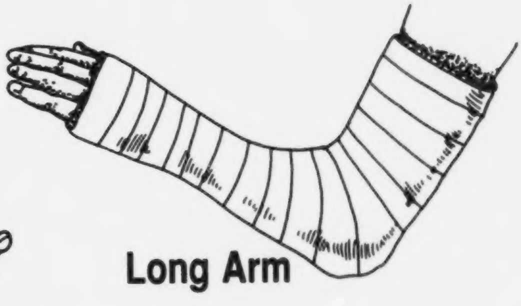
Short Leg



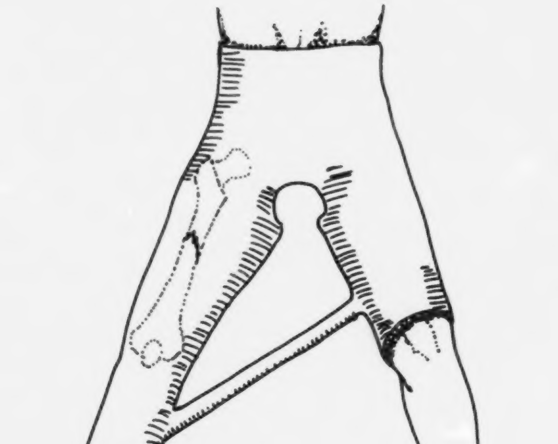
Short Arm



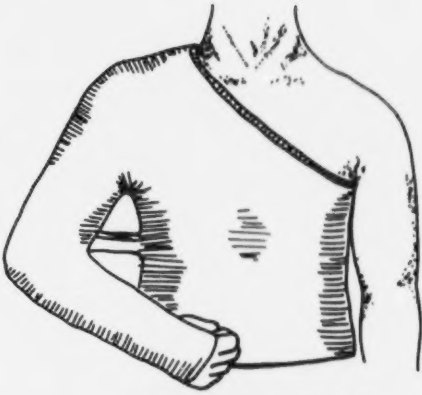
Long Leg



Long Arm

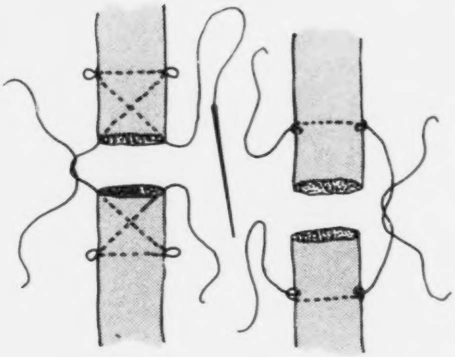


Hip Spica

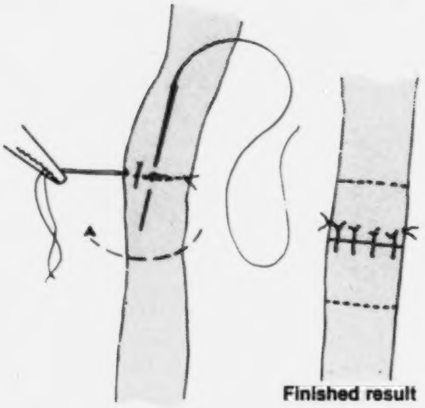


Shoulder Spica

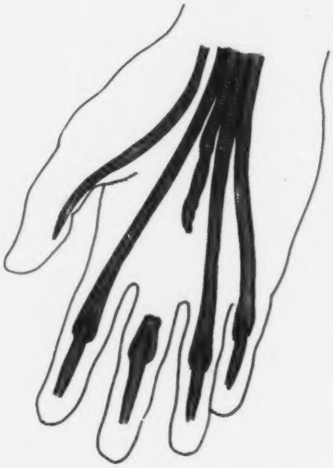
Tendon Repair



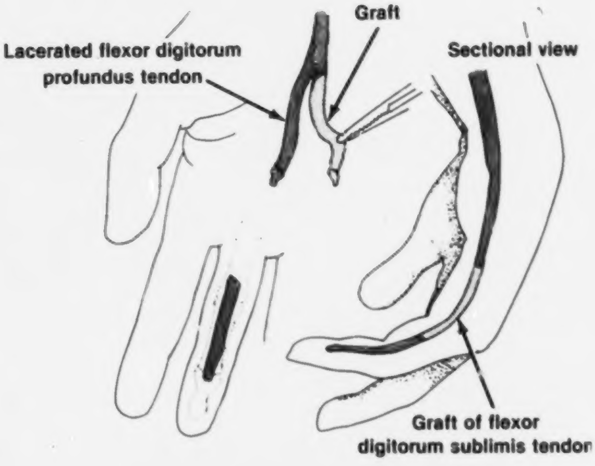
Tension sutures placed


Finished result

Additional sutures placed to complete tendon repair

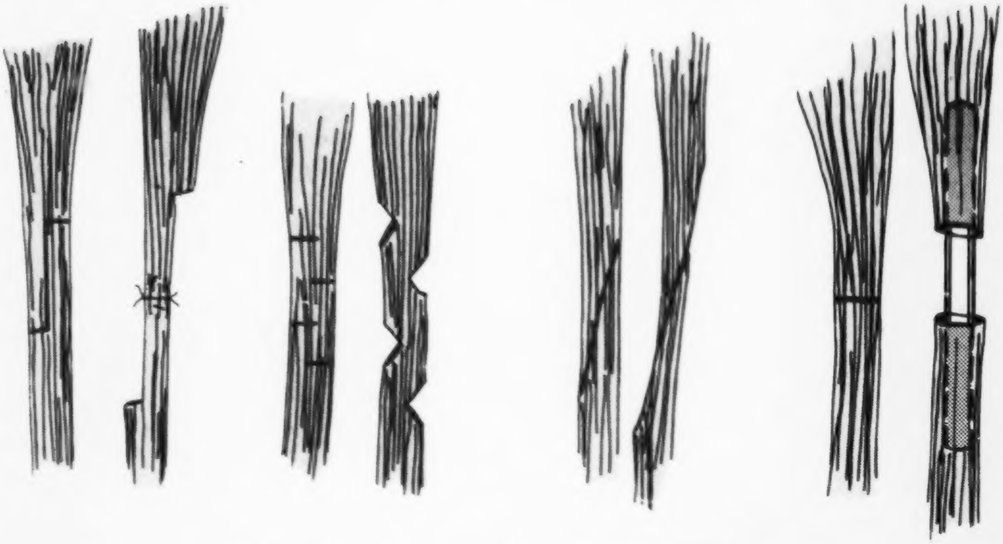


Tendon laceration in hand

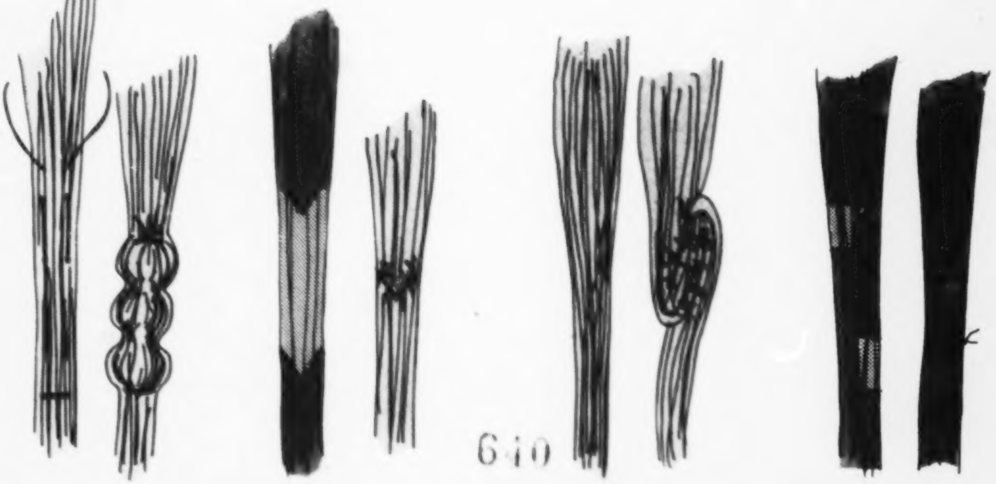

Graft
Lacerated flexor digitorum profundus tendon
Sectional view
Graft of flexor digitorum sublimis tendon

Use of graft for tendon repair

Tendon Lengthening and Shortening



Methods of Tendon Lengthening



Methods of Tendon Shortening

Orthopedic Surgery
Unit 10

Information Sheet

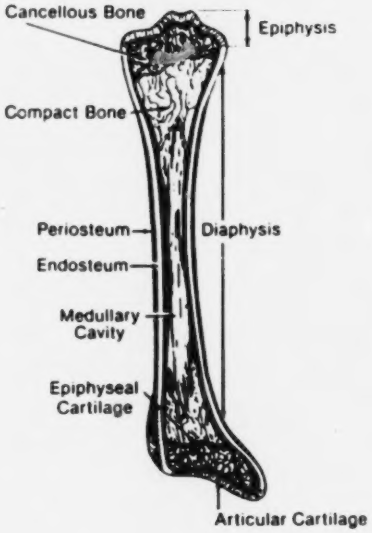
1. **Terms and definitions**

- **Abduction** — Withdrawal of a part away from the midline
- **Acetabulum** — Depression in the hip bone which receives the head of the femur
- **Acromioclavicular (AC) joint** — Point where the clavicle joins the acromion process (lateral extension) of the scapula
- **Adduction** — Act of drawing a part toward the midline
- **Arthritis** — Inflammation of a joint
- **Arthrotomy** — Surgical incision of a joint
- **Articular cartilage** — Special type of dense connective tissue which covers bone surfaces in a joint
- **Articulation** — Joint; place of union or junction between two or more bones
- **Atrophy** — Wasting away or diminution in the size of a part
- **Bone** — Individual part of the skeleton; osseous tissue
- **Bone marrow** — Vital substance found in the medullary canal of long bones and in the porosities of cancellous bone
- **Bursa** — Small closed sac lined with synovial membrane; facilitates the gliding of muscles or tendons over bony or ligamentous surfaces
- **Cancellous bone** — Spongy bone found at the ends of long bones and within flat bones; contains red marrow
- **Cartilage** — Elastic substance attached to articular bone surfaces; forms certain parts of the skeleton
- **Compact bone** — Hard bone tissue which forms the outer covering of bone
- **Condyle** — Rounded projection at the end of a bone that anchors muscle ligaments and articulates with adjacent bones
- **Cortical bone** — Hard bone that forms the shell of all bones to act as a supporting structure

Information Sheet

- **Curvature** — Normal or abnormal bending or sloping away; a curve
- **Diaphysis** — Shaft of a long bone

Figure 1—Structures of a long bone


Cancellous Bone
Epiphysis
Compact Bone
Periosteum
Diaphysis
Endosteum
Medullary Cavity
Epiphyseal Cartilage
Articular Cartilage

- **Dislocation** — Displacement of a part of a joint
- **Distal** — Situated or directed farther away or remote from the area under consideration; the opposite of proximal
- **Dorsiflexion** — Flexion or bending of the foot toward the leg
- **Dysplasia** — Abnormal tissue growth and development
- **Endosteum** — Lining inside bones (medullary or marrow cavity) which makes new bone
- **Epiphysis** — Two ends of a long bone
- **Eversion** — Turning outward
- **Exostosis** — Bony growth that arises from the surface of a bone
- **Extension** — Movement which brings the limb into or toward a straight condition
- **Fibroma** — Tumor composed of fibrous or fully developed connective tissue

Information Sheet

- **Flexion** — Act of bending or condition of being bent
- **Foramen** — Natural opening in bone through which nerves, vessels, and other structures pass
- **Foramen magnum** — Opening in the occipital bone through which the spinal cord passes enroute to the vertebral column
- **Fossa** — Shallow depression in a bone
- **Fracture** — Break in the bone; loss of continuity of a bone
- **Hallux** — Great toe
- **Implant** — To insert or graft
- **Inversion** — Turning inward
- **Joint capsule** — Fibrous sheath that encloses articular bone surfaces
- **Lamina** — Thin plate or flat layer of bone
- **Lateral** — Situated or directed away from the midline of the body or one of its parts
- **Ligament** — Band of exceptionally strong, flexible connective tissue which joins articular bone surfaces
- **Malleolus** — Rounded bony process, such as the protuberance on each side of the ankle
- **Malunion** — Union of the fragments of a fractured bone in faulty position
- **Medial** — Near or nearness to the midline
- **Non-union** — Failure of the ends of a fractured bone to unite; false union; pseudoarthrosis
- **Osteogenesis** — Origin and development of bone tissue; ossification
- **Osteomyelitis** — Inflammation of a bone caused by a pyogenic organism; may remain localized or may spread through the bone
- **Osteoporosis** — Diminished amount of calcium in the bone
- **Osteotomy** — Surgical cutting of bone

Information Sheet

- **Pelvic girdle** — Bony structure which supports the trunk and provides attachment for the legs

  Note: The pelvic bone originally consists of three separate bones—the ilium, ischium, and pubis, which fuse during development.

- **Periosteum** — Membrane surrounding a bone; contains blood vessels which nourish the bony tissue

- **Plantar flexion** — Side of the foot in a condition of being bent; extension of the foot

- **Polydactylism** — More than the usual number of fingers or toes

- **Pronation** — Act of turning the palm of the hand downward or toward posterior surface of body

- **Proximal** — Situated or directed nearer to the area under consideration; opposite of distal

- **Pseudoarthrosis** — False joint sometimes seen following a fracture or in a failure of an arthrodesis or fusion

- **Scoliosis** — Abnormal curvature of the vertebral column

- **Syndactylism** — Webbing between adjacent digits

- **Synovial membrane** — Lining of the joint capsule

- **Tendon** — Fibrous tissue structure which serves to connect muscle to bone and other parts

- **Traction** — Pulling force exerted on bones or muscles by means of weights and pulleys to align or to immobilize the part

- **Valgus** — Bent outward; away from the midline of the body distal to joint or point described

- **Varus** — Bent inward; toward the midline of the body distal to joint or point described

- **Volar** — Anterior or palmar surface

- **Volkmann's contracture** — Degenerative contracture and atrophy of a muscle resulting from long continued interference with normal circulation

Information Sheet

2. **Basic purpose of orthopedic surgery** — To preserve and restore functions to the skeletal system, its articulations, and associated structures

3. **Special features of orthopedic surgery**

    a. Aseptic technique is critical in orthopedic surgery since soft tissue infections may lead to osteomyelitis.

    Caution: Great care must be taken because acute osteomyelitis may cause nonunion of fractures, chronic infection that remains for life, or even eventual loss of limb.

    (1) A 10-minute surgical scrub is usually required for each orthopedic procedure.

    (2) Always gown and glove from an area separate from the backtable.

    (3) Hand towel and gown to surgeon unopened.

    (4) Do not glove yourself until your gown is tied.

    (5) Always double glove.

    (6) During the operative procedure, the scrub person should change his/her gloves before gowning and gloving another person.

    (7) Movement in the operating room should be kept to a minimum.

    b. Cast rooms separated from operating rooms are used to reduce the presence of plaster dust in the operating room.

    Note: If a cast room is not available, the cast should be removed or bivalved in the patient's room to avoid dispersal of plaster dust, lint, and microorganisms in the O.R.

    c. Patients' beds and frames (traction) should be decontaminated in the preanesthesia care unit before entering the operating room.

    d. Laminar airflow systems are used in some hospitals to reduce airborne microorganisms in an effort to prevent infection.

    e. Antibiotic irrigations are used on open fractures and may be used during other procedures to reduce the risk of infection and osteomyelitis.

    Note: The type and strength of antibiotic used depends on the surgeon's preference. Check the patient's chart for any drug allergies.

Information Sheet

f. Anesthesia may be general, regional, or local.

Note: Regional blocks include spinal, epidural, and peripheral. Local anesthesia may be used for closed reductions on an adult.

g. Although many orthopedic instruments are big and heavy, they must be handled carefully, especially their cutting edges.

h. There are **many** orthopedic instruments, and each has a specific purpose for a specific part of the body.

Example: Instruments used for hip procedures are not appropriate for hand procedures.

i. Nonabsorbable sutures are generally used on ligaments, tendons, and muscles because they are relatively slow to heal. Absorbable sutures are used on the periosteum.

j. Hemostatic aids must be ready at all times. These include

(1) Cautery

(2) Bone wax

(3) Absorbable gelatin sponges

k. Bone grafts may be used to provide structural support.

Note: Grafts may be autogenous usually obtained from the crest of the ilium or cortical bone from the tibia, or they may be homogenous allografts (cadaver bone) when bone is not available from the patient.

4. Positioning, prepping, and draping for orthopedic surgery

a. Positioning

(1) Positioning of the orthopedic patient should be directed by the surgeon as immobilization and good body alignment are of the utmost importance.

(2) The operating room staff should know the meaning of directional terms (flexion, rotation, etc.) to assist the surgeon when positioning the patient.

(3) The orthopedic table (fracture table) is commonly used for operations requiring traction, image intensification (C-arm), intraoperative x-rays, and cast applications.

Examples: Chick, Stryker

Information Sheet

(4) Various table attachments and accessories are used in positioning the orthopedic patient.

Examples: Lateral body brace, sacral rest

(5) Additional positioning devices are commonly used when the patient is in the prone position to ensure proper ventilation.

Examples: Wilson convex frame, Morgan disc pads, chest rolls, doughnuts, Andrews frame, sand bags

(6) Extra pillows and blankets are required for protection of bony prominences.

b. Skin preparation and shave

(1) Surgical clippers may be used when removing hair from the incision site.

(2) When shaving is necessary, it should be done as close to the time of surgery as possible.

(3) Hair should not be removed in the operating room.

(4) When prepping an extremity, the tourniquet should be applied first. A self-adhering incise drape should be used to prevent the prep solution from running under the tourniquet.

(5) The operative prep is carried out under sterile conditions.

(6) Ten-minute preps are usually performed.

(7) Gel preps may be preferred because they do not pool.

Caution: Pooling of prep solutions may cause chemical burns to the patient's skin.

(8) Extremities are always elevated during the surgical prep.

Note: Various foot and knee holders are available to accomplish this task.

(9) The prep should extend from one joint above to one joint below the operative site.

Information Sheet

c. Draping

(1) Orthopedic surgical drapes are bulky and difficult to handle so the surgical team must take extra precautions to prevent contamination of the drapes.

(2) Standardized drape packs may be available for use.

Examples: Lower extremity, arthroscopy

(3) An impervious stockinette is used to cover a whole extremity.

Note: A hole will be cut to expose the incision site when draping is completed.

(4) Most orthopedic drapes have a band of adhesive along one edge to prevent telescoping.

(5) Sterile towels may be used to secure a foot or hand.

(6) Single sheets are used to cover exposed areas away from the operative site.

(7) Split sheets are used to conform snugly around an extremity.

(8) Iodophor-impregnated adhesive drapes are frequently used to lower infection rates.

(9) The step-by-step procedure used for draping depends on the surgeon's preference.

5. Special equipment and supplies used in orthopedic surgery

a. **Operating microscope** for delicate procedures

b. **Power-driven instruments**

Examples: Bone saws, drills

c. **Nerve stimulator** to identify nerves

d. **Fixation devices** to stabilize bone

Examples: Plates, screws, pins, rods, nails

e. **Prosthetic implants** to permanently replace bone and joints

Information Sheet

f. **Electrical bone stimulator** to stimulate bone growth when non-union of a fracture occurs

Note: Bone stimulators may be non-invasive, implantable, or percutaneous.

g. **Bone cement** to reinforce bone or bond metal and synthetic implants in place

Note: Bone cement is made of methyl methacrylate. The scrub person should check manufacturers' labels, instructions, and MSDS sheet before use.

h. **Casts** for external fixation and immobilization of a fractured bone

i. **Braces and immobilizers** for support

Note: Immobilizers may be made of cloth and/or foam with or without metal stays.

j. **Tourniquets** for extremities to create an operative field as clear of blood as possible.

k. **Conventional x-ray or image intensifiers** used for invasive and non-invasive procedures.

Note: It is the surgical team's responsibility to contact radiology before the procedure if this equipment is to be utilized.

l. **Traction devices** to provide a steady pull on the distal part of the body from a fracture site.

Examples: Skin traction—Bucks, Russel; skeletal traction

Note: Traction is used for fractures that are difficult to reduce and immobilize in a cast. Balanced suspension is often used with traction to prevent excessive pull and less pain for the patient.

6. **Special abbreviations used in orthopedic surgery**

a. ORIF — Open reduction, internal fixation

b. CRIF — Closed reduction, internal fixation

c. CRExt.F — Closed reduction, external fixation

Information Sheet

d. For amptutations

    (1) BK — Below knee

    (2) AK — Above knee

    (3) BE — Below elbow

    (4) AE — Above elbow

7. **Preoperative diagnostic work that may be required for orthopedic surgery**

    a. X-rays (when fractures or joint instabilities are suspected)

    b. Computerized tomography (CT)

    c. Magnetic resonance imaging (MRI)

    d. Bone densitometers

    e. Arthroscopy (to visually inspect a joint)

8. **Guidelines for use of pneumatic tourniquets**

    a. The pneumatic tourniquet is used on extremities when a bloodless wound site is necessary.

    b. The tourniquet is nonsterile. It consists of an inner bladder covered with an outer layer of synthetic material.

    c. It connects to the air tank and regulator. Regulator controls both tank and cuff pressure.

    d. The tourniquet cuff is positioned after the extremity has been wrapped with a soft cotton material such as a soft roll (or Webril).

    e. Wrinkles in skin or wrapping material must be avoided to prevent patient injury caused by the pressure exerted by the cuff.

    f. The cuff should never be placed directly at the knee or elbow because of superficial nerves.

    g. After prepping and draping, the surgeon may wrap the extremity with a sterile Esmarch bandage to exsanguinate the extremity.

    h. After elevating the extremity, the circulator will inflate the cuff, and the surgeon will remove the Esmarch bandage.

Information Sheet

i. The following tourniquet pressures are commonly used:

   (1) 250-300 mm Hg for upper extremity

   (2) 250-450 mm Hg for lower extremity

   Note: Many surgeons prefer to inflate the tourniquet to settings only higher than the patient's systolic pressure such as 50-75mm Hg for upper extremity and 100-150 mm Hg for lower extremity.

j. Tourniquets are timed and recorded on both the anesthesia record and operating room record.

k. The maximum time that a tourniquet may be left in place is two (2) hours.

l. The surgeon should be informed at regular intervals of the time since the tourniquet was put in place (such as every 15-30 minutes).

m. If it is necessary to extend time beyond two hours, the cuff will be deflated for 5-10 minutes, and then reinflated.

9. **Specialized instruments used in orthopedic surgery**

   a. **Bone clamps, bone hooks** — Used to grasp bone fragments and hold while stabilizing devices are installed

   b. **Cutters** — Used to cut pins, wires, or wire sutures

   c. **Drivers, impactors, extractors** — Used to insert or remove implants, such as nails, staples, and nail-plate combinations

   d. **Elevators** — Used to free periosteum from bone or for fine bone dissection

   e. **Knives** — Larger and heavier than conventional scalpel blades in order to cut heavier tissue such as cartilage

   f. **Measuring devices** — Used to measure depth of drill hole or to measure width of bone; frequently used in joint replacement procedures

   g. **Osteotomes, curettes, gouges, chisels** — Cutting instruments used to trim bone and to remove bone which may be used as a graft

   h. **Rasps, files** — Used to smooth rough bone surface or to hollow out medullary cavity for prosthesis

   i. **Reamers** — Used to form a hollow area in a bone

j. **Retractors** — Large and small instruments used to retract bone or soft tissue

k. **Rongeurs** — Cutting instruments similar to scissors but heavy enough to cut through bone; take "bites" of bone

Note: Double-action rongeurs have two hinge joints, single-actions have one.

l. **Saws, drills** — Used to cut apart or cut out portions of bone; may be power-driven or manual

m. **Screwdrivers** — Used to insert or remove screws from plates or bones; may be power-driven or manual

n. **Wrenches** — Used to insert plates, screws, and nails

10. **Guidelines for use of air-powered instruments**

a. Air-powered instruments are used for precision cutting, shaping, and repair of bone.

b. Because these are high-speed instruments, they can reduce the operating time over manually-driven instruments.

c. Nonflammable nitrogen gas or compressed air is used to power these instruments.

d. Many attachments are available.

Examples: Saws, drills, chucks

e. Attachments and blades must be completely seated and locked in the handle before power is activated.

f. The safety should be in place when not in use.

g. These instruments should be handled with the same care as other surgical instruments—do not drop or tumble; protect delicate cutting edges.

h. Handle the hose with care to prevent breaks.

i. Do **not** clean in ultrasonic cleaners, which dislodge oil from the bearings and cause irreversible damage.

j. Do **not** immerse in **any** liquid because this will corrode the metal and the delicate moving parts.

k. Instruments are to be cleaned and sterilized according to the manufacturer's instructions.

Information Sheet

11. Types of orthopedic surgery

a. Repair and management of fractures

b. Repair/reconstruction of tendons and ligaments

c. Diagnostic examinations of joints

d. Revision/reconstruction of joints

12. Five stages of bone healing

Note: Bone healing occurs by osteogenesis.

a. **Hemorrhage** (occurs when bone is fractured and forms a clot)

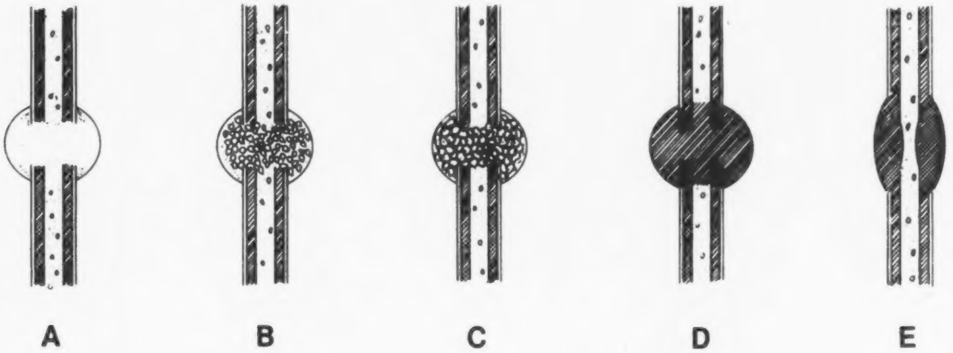
b. **Granulation** (granulation tissue coming from the ends of the bone fragments invades the blood clot)

c. **Callus formation** (calcium deposits in granulation tissue form immature bone)

d. **Consolidation** (cartilage cells within the callus develop a semirigid tissue that helps stabilize the bone fragments)

e. **Remodeling** (callus is remodeled by new connective tissue cells to form mature bone; excess callus is reabsorbed)

Figure 2—Stages of bone healing



Information Sheet

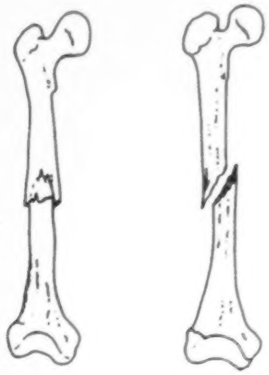
13. Classifications of fractures

a. Traumatic fracture

(1) Caused by impact, forced twisting, or bending of bone(s)

(2) Occurs when bone is fatigued by overwork or has inadequate muscle support during exertion

Figure 3 — Examples of traumatic fractures



b. Pathologic fracture

(1) Caused by demineralization of bone from one of the following:

- (a) Osteoporosis
- (b) Aging process
- (c) Primary or metastatic malignant bone disease

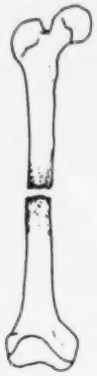
(2) May require more than simple fixation of bone fragments

- (a) Bone allograft to supplement bone loss
- (b) Bone cement to increase bone strength

Information Sheet

(c) Collagen protein mixed with ceramic material to stimulate cartilage and osteoblast growth

Figure 4—Pathologic fracture



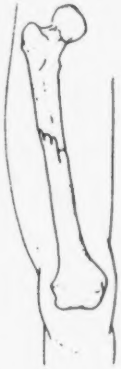
c. Closed fracture

(1) May be referred to as a simple fracture

(2) Bone fragments do not protrude through adjacent tissue to puncture skin.

(3) Bone may be displaced or non-displaced.

Figure 5—Closed fracture



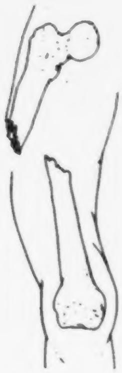
Information Sheet

d. Open fracture

   (1) May be referred to as a compound fracture

   (2) Bone fragments protrude through adjacent tissues and skin.

   Figure 6—Open fracture



Note: Exposed bone causes an increased risk of infection. An open fracture is treated as a surgical emergency.

14. **Types of fractures** (Figures 7 and 8)

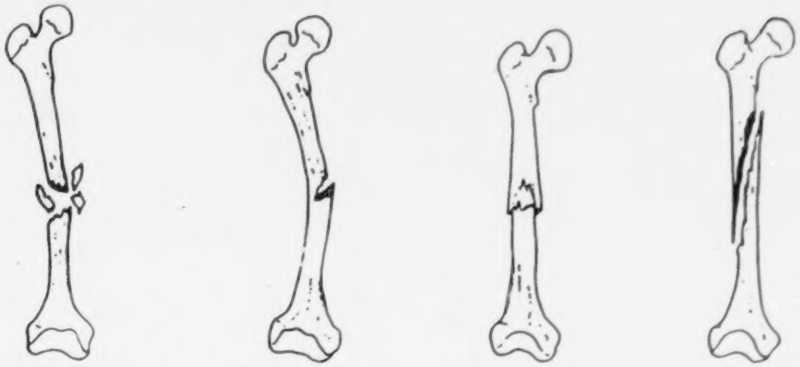
    a. Comminuted — Fracture that causes the bone to splinter and break into more than two pieces

    b. Greenstick — An incomplete fracture partially bent and partially broken; commonly found in children whose bones have not completely calcified

    c. Impacted — Fracture in which a portion of the bone is traumatically driven into another bone fragment or adjacent bone and which is relatively fixed in that position

    d. Longitudinal — Fracture which runs along the length of the bone

Figure 7—Types of fractures



Comminuted **Greenstick** **Impacted** **Longitudinal**

e. Multiple — Fracture in which the bone is broken in several different places

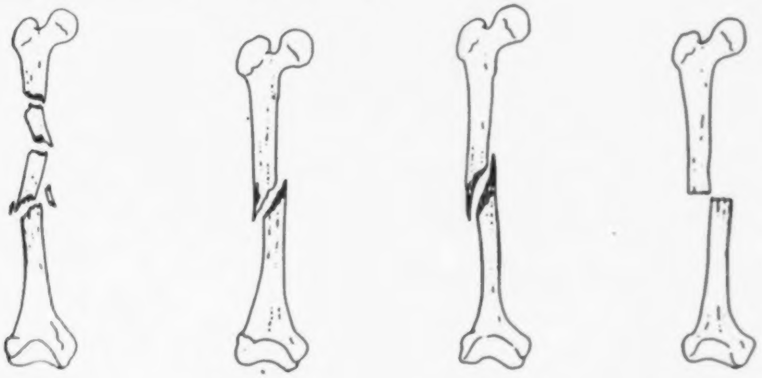
f. Oblique — Fracture in which the fracture line lies at an angle to the long axis of the bone

g. Spiral — Fracture which forms a spiral pattern around the bone

h. Transverse — Fracture in which the fracture line lies perpendicular to the long axis of the bone

Note: A transverse fracture of the distal end of the radius is called a Colles' fracture.

Figure 8—Types of fractures (continued)



Multiple **Oblique** **Spiral** **Transverse**

Information Sheet

15. **Methods for treating fractures**

    a. Closed reduction — Surgeon reduces the fracture manually without making an incision to expose the fracture site

    b. Open reduction — Surgeon reduces the fracture after making an incision to expose the fracture site

    c. External fixation — Surgeon uses external devices that hold bone fragments in place from the outside while healing occurs

    Examples: Casts, splints, external fixation frames (Hoffman, AO, Ilizarov tibial), skeletal traction

    Note: External fixation frames decrease the risk of infection, allow for treatment of soft tissue wounds, and enable the patient to use the fractured limb earlier.

    d. Internal fixation — Surgeon uses internal devices that hold bone fragments in place from the inside while healing occurs

    Examples: Plates, screws, pins, wires, nails, or intramedullary rods, nails, and pins

16. **Requirements of casts**

    a. Must support and immobilize the body part in optimum position until healing takes place

    b. Must not be too tight, which would interfere with adequate circulation

    c. Must not be too loose, which could allow body part to shift

    d. Must not have pressure areas

    e. Must be as light as possible, yet strong enough to withstand usage

    f. Must be comfortable with no binding or chafing

17. **Types of casting materials**

    a. **Plaster of paris**

    (1) Gypsum or anhydrous calcium sulfate that sets when water is added

    (2) Least expensive material available and easy to apply

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b. **Synthetic**

   (1) Materials usually made of fiberglass that are applied according to the manufacturer's instructions

   (2) Lightweight, waterproof, and easy to apply

18. Characteristics of plaster casts

a. The body part to be immobilized is first covered with stockinette, followed by soft roll, sheet wadding, or cotton bandaging such as Webril prior to the application of the cast.

b. The procedure for applying casts is as follows:

   (1) Plaster rolls or strips are placed in a bucket of tepid or cool water until air bubbles no longer rise from the roll to rehydrate the plaster.

   (2) Excess water is squeezed (not twisted) from plaster roll to prevent dripping by crimping edges gently or by pushing both ends toward middle.

   (3) Plaster rolls or strips are applied to body part and allowed to harden.

c. Plaster casts are available in rolls and strips 2″-8″ wide.

d. An exothermic chemical reaction occurs as plaster begins to harden which involves a heating up of the material.

e. Limbs are supported while the plaster is hardening on pillows or the palm of the hand (not the fingers which would leave impressions).

Caution: The pillows used must *not* be covered with plastic because they could burn the patient.

f. Plaster casts require various times to harden depending on the material used.

   (1) Slow setting — Up to 18 minutes; used for large casts which require more time to apply and hold

   (2) Medium setting — Up to 8 minutes; used for average size casts

   (3) Fast setting — 4-5 minutes; most commonly used; advantageous for small casts and casts on children who are difficult to keep in position

g. Casts are commonly removed with electric cast saws or plaster knives and scissors with the aid of cast spreaders for prying open the cast.

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19. Types of common casts

a. **Upper body/extremities**

(1) **Short arm cast** — Applied from below the elbow to the knuckles for wrist fractures

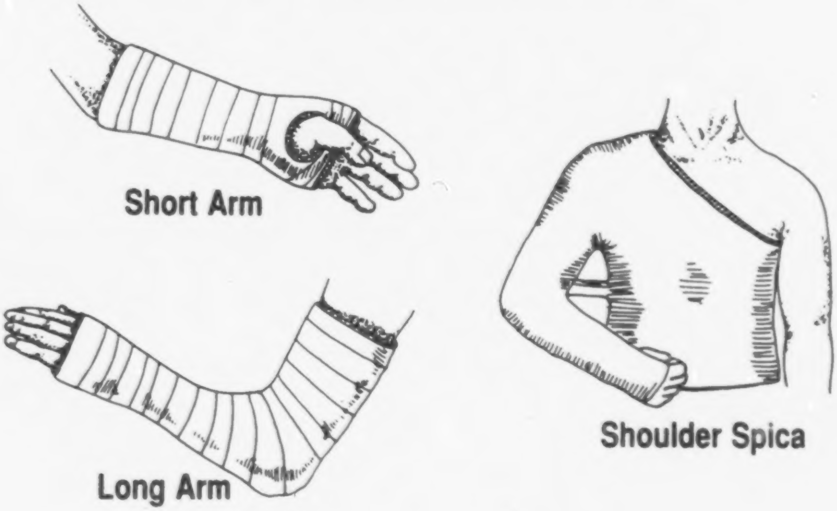
(2) **Long arm cast** — Applied from above the elbow to the knuckles for fractures of the elbow or the forearm

(3) **Shoulder spica** — Applied to the trunk, arm, and hand for fractures of the humerus or following procedures on the shoulder or humerus when complete immobilization is required

(4) **Body jacket/cast** — Applied to the trunk from the axillae to hips for immobilization of the vertebrae

(5) **Minerva jacket** — Applied to the trunk from the hips to or including the lower portion of the head for fractures of the cervical or upper thoracic vertebrae

Figure 9—Examples of casts for upper body/extremities



Information Sheet

b. **Lower body/extremities**

(1) **Short leg cast** — Applied from below the knee to the toes primarily for fractures of the foot and ankle

(2) **Long leg cast** — Applied from the groin to the toes for distal fractures of the femur and fractures of the tibia and fibula

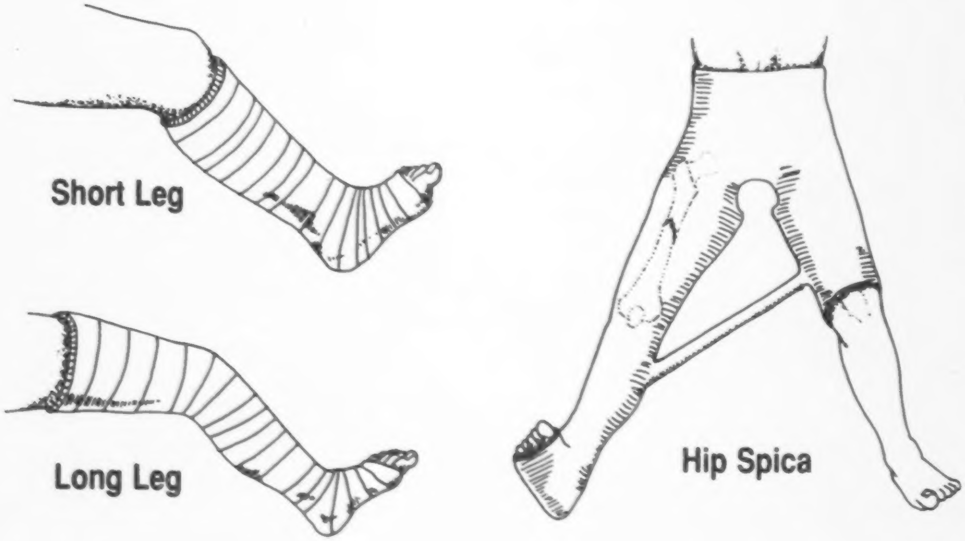
Note: A rubber heal or cast shoe may be used with leg casts to allow walking.

(3) **Cylinder cast** — Applied from groin to the ankle for fractures of the patella and to immobilize the knee

(4) **Femoral cast brace** — Designed to immobilize a femoral shaft fracture without immobilizing the hip joint or the knee joint

(5) **Hip spica** — Applied to the trunk and one or both legs for fractures of the femur and following some hip operations

Figure 10—Examples of casts for lower body/extremities



Information Sheet

20. Common fracture sites and treatment

a. Fractures of the clavicle

(1) Usually occur in the middle third of the clavicle

(2) May be treated by immobilization in a figure-of-eight splint if not displaced

(3) ORIF is indicated if displacement causes damage to underlying vessels and/or the brachial plexus. A tubular plate and screws or intramedullary pins are commonly used.

b. Fractures of the humeral head

(1) Usually require an ORIF with screws or pins

(2) Closed reduction may be accomplished and a humeral fixation device used for immobilization.

(3) Severely comminuted fractures may require prosthetic implant replacement of the humeral head (humeral head arthroplasty)

c. Fractures of the humerus

(1) Reduction is usually accomplished by closed manipulation with immobilization.

(2) ORIF is usually accomplished with a nail, rod, or compression plate.

(3) When fracture occurs distally (supracondylar, epicondylar, intercondylar), closed reduction is rarely successful. Internal fixation may be accomplished with screws, wires, or pins.

d. Fractures of the olecranon

(1) If fracture is small, the bone fragment(s) may be removed and the triceps tendon reattached to the ulna shaft.

(2) If fracture is large, internal fixation is required using screws, wires, or pins.

e. Fractures of the radius and ulna

(1) Occur frequently in children and are usually treated by external fixation; seldom need internal fixation.

(2) When internal fixation is indicated, intramedullary pins or compression plates are frequently used for one or both bones.

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f. Fractures of the carpal bones

  (1) Most are treated by closed reduction and immobilization.

  (2) Internal fixation is usually accomplished with wires, small plates, and/or screws.

g. Fractures of the hip

  (1) Intertrochanteric fracture

    (a) Occur most frequently in the elderly
    (b) Require internal fixation because the lower extremity will be externally rotated
    (c) Fixation is accomplished by using compression hip plates, screws, and/or nails.

    Note: There are various fixation devices available for this type of procedure.

  (2) Fractures of the femoral neck

    (a) Have a high incidence of complications such as non-union and aseptic necrosis of the femoral head.
    (b) In children may occur through the epiphyseal growth plate
    (c) Require internal fixation by various designs of pins and screws.
    (d) Femoral head prosthetic replacement, an endoprosthesis, may be used to replace the femoral neck and head when fixation cannot be accomplished.

h. Fractures of the femoral shaft

  (1) Usually caused by high impact injuries

  (2) Conservative treatment includes skeletal traction for 3-6 weeks followed by cast immobilization.

  (3) Surgical treatment includes closed or open intramedullary nailing.

    (a) Closed — Fracture site is not exposed; requires one incision over the greater trochanter
    (b) Open — Fracture site is exposed; requires two incisions—one over greater trochanter and one over the fracture site
    (c) Skeletal traction (usually 3 weeks) and then closed nailing is often the treatment of choice.

Information Sheet

i. Fractures involving the knee

   (1) Fractures of the femoral condyle and tibial plateau

      (a) Condylar fractures may be single condylar or multicondylar; referred to as a T or Y fracture
      (b) Non-displaced may be treated by casting for immobilization.
      (c) Displaced fractures are treated by open reduction and fixation with screws or a right-angled condylar blade plate.
      (d) Tibial plateau fractures often involve compression of the lateral condyle and articular surface.
      (e) Internal fixation includes the use of screws, buttress plates, and bone grafting.

   (2) Fractures of the patella

      (a) May require partial removal of patella
      (b) Internal fixation includes the use of suture and tension band wiring or a screw.

j. Fractures of the tibia

   (1) Can usually be treated with closed reduction and immobilization

   (2) Internal fixation includes the use of screws, compression plates, or intramedullary nails.

   (3) Open fractures are more common in the tibia than any other bone.

k. Fractures of the ankle

   (1) Include the medial malleolus (tibia), lateral malleolus (fibula), and posterior malleolus (articular surface of the distal malleolus)

   (2) Medial and posterior fractures require open reduction using pins, malleolar screws, or plates and screws.

   (3) When the lateral malleolus is displaced, open reduction with pins, rods, or long bone screws is required.

l. Fractures of the metatarsals

   (1) Fractures occur in various sites

   (2) Reduced healing is possible due to decreased vascularity.

   (3) Open reduction fixation is achieved using small pins, wires, screws, or plates.

m. Fractures of the vertebral column

   (1) Fractures occur in various sites

   (2) Can often be treated by immobilization

   Note: The type of immobilization needed will depend on where the fracture occurs. For example, cervical fractures may require a halo vest, thoracolumbar require traction or body cast or jacket.

   (3) Open reduction and internal fixation may be achieved using wires, screws, rods, and/or hooks.

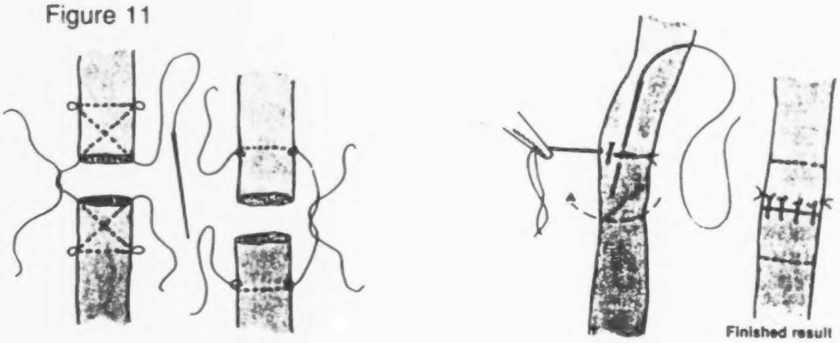
   Note: All internal fixation devices for the spine have biomechanical advantages and potential complications.

21. Characteristics of tendon and ligament repairs

a. Are performed for severed, torn, or ruptured tendons and ligaments

b. Are intricate procedures which involve a reapproximation and suturing of the severed ends

Figure 11



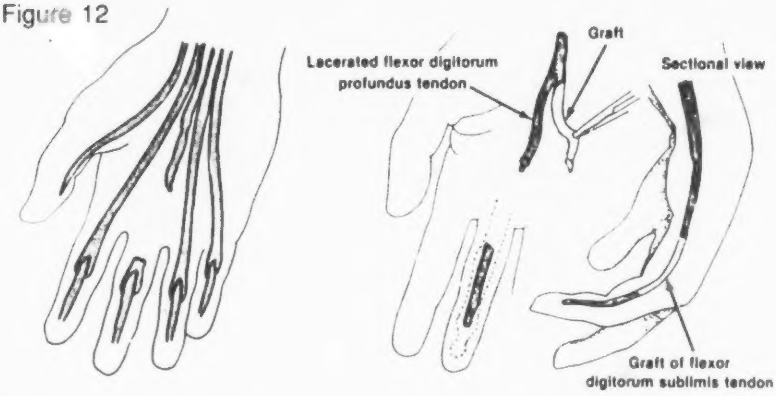
Tension sutures placed

Additional sutures placed to complete tendon repair

Information Sheet

c. When tendons are destroyed, grafts may need to be used.

Figure 12


Lacerated flexor digitorum profundus tendon
Graft
Sectional view
Graft of flexor digitorum sublimis tendon

Tendon laceration in hand **Use of graft for tendon repair**

d. Tendons may have to be lengthened or shortened for correct functioning.

Figure 13—Methods of tendon lengthening

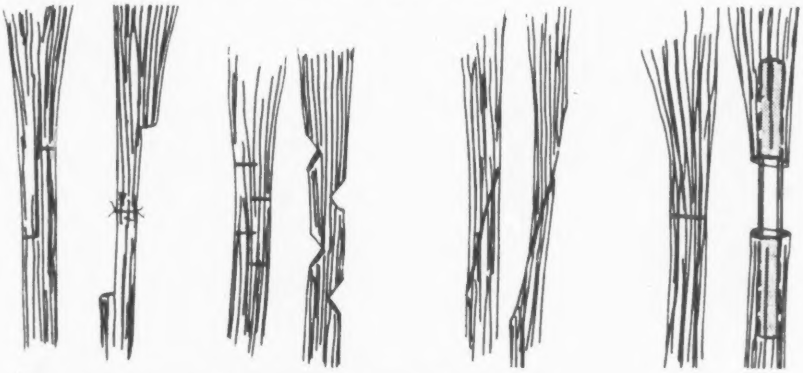
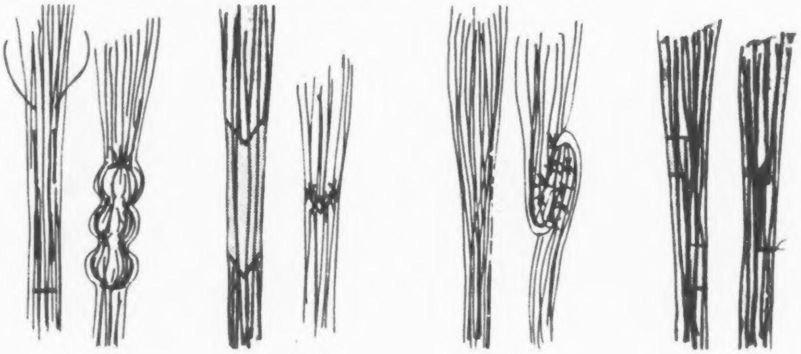


Figure 14—Methods of tendon shortening



Information Sheet

e. Artificial tendons made of polyester covered with silicone rubber are available when the patient's tendons cannot be repaired.

f. Repaired tendons may be wrapped in a silicone membrane to prevent adhesions.

g. Ligament repair for shoulder separations require use of a double velour polyester prosthesis.

h. Stainless steel suture is commonly used for tendon repairs because of its durability.

i. Tendon repairs on the hand are commonly performed by plastic surgeons.

22. Characteristics of arthroscopic surgery

a. Arthroscopic surgery is performed for diagnosis and/or definitive treatment of meniscal, articular cartilage, and ligamentous defects.

b. It may be performed on the knee, shoulder, elbow, wrist, or ankle.

c. Advantages include lower risk of infection, no disruption of extensor mechanisms, decreased operative pain, and earlier rehabilitation.

d. Sterile irrigation solutions (normal saline or Ringers) are used at room temperature to extend the joint.

e. Compression dressings are used to prevent swelling.

23. Procedure for arthroscopy of the knee

a. Patient is placed in supine position with a pneumatic tourniquet placed high about the thigh on affected leg. With the leg elevated, the pneumatic tourniquet is inflated.

b. Affected leg is placed in a leg holder in a routine fashion. The knee is then prepped and draped so that the knee is exposed and the remainder of the leg is free in a sterile fashion.

c. Surgeon introduces the arthroscope cannula and trocar into the anterolateral aspect through a separate portal.

d. Knee is inflated with normal saline solution and an outflow catheter is placed in an upper, outer portal.

e. Arthroscopic examination is performed by attaching the videocamera or by looking through the scope with the eye.

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f. Surgeon performs additional procedure, if necessary, based on arthroscopic examination.

Examples: Medial or lateral meniscectomy, patella shaving, trephination of condyles, debridement, anterior and posterior cruciate

g. Joint is irrigated removing all bits and pieces.

h. Surgeon removes all tubes from the knee, and the wounds are closed subcutaneously.

i. Compression dressing is applied, and pneumatic tourniquet is deflated and removed.

24. Characteristics of reconstructive joint surgery

a. Reconstructive joint surgery is performed to alleviate pain and to create improved range of motion and stability of the joint.

b. Correct alignment and fit of component parts are critical to their function.

c. Joints may be partially or totally reconstructed.

d. Bones on both sides of the joint may be replaced or resurfaced.

e. Component parts are made of various alloys, ceramics, high density polyethylene, and silicone.

f. Metal to plastic components are self-lubricating.

g. Component parts may be held together in the following ways:

(1) Cemented — Components are held in place by bone cement

(2) Non-cemented — Remain in place without the use of bone cement.

(a) Porous-coated — Contain surface pores that allow bone ingrowth to attach the component to the bone.
(b) Anatomic press-fit — Relies on direct bone to prosthesis contact which is achieved by reshaping bone to size of implant and/or securing pegs, threads, or screws on prosthesis into bone

(3) Hybrid — One component (usually the femoral stem) is cemented but the other component (acetabular cup) is not cemented.

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h. Special precautions are used to prevent infection.

   (1) Laminar airflow

   (2) Ultraviolet lights

   (3) A space suit type helmet and attire with separate exhaust systems

   (4) Antibiotic irrigation solutions

   (5) Impervious non-woven gowns and drapes

   (6) Limited movement of personnel into and out of the operating room.

25. Procedures used in joint reconstructions

a. **Arthrodesis** — Surgical fixation or fusion of a joint; primarily performed following resection of recurrent benign or malignant lesions of the bones and joint and for rheumatoid arthritis

   Note: Because it limits motion, other joint reconstruction procedures are usually attempted before resorting to arthrodesis.

b. **Arthrotomy** — Incision into a joint to biopsy the synovium or cartilage, to remove bone or cartilage fragments, or to repair a defect in the synovium or joint capsule

c. **Arthroscopy** — Direct visualization into a joint through an endoscope for diagnosing and treating joint defects

d. **Arthroplasty** — Surgical formation/reconstruction of a joint by reshaping, resurfacing, or replacing the articular surfaces; designed to restore or improve range of motion and stability or to relieve pain

e. **Repair of joint dislocations** — Moving the articular surface of the bone back into proper alignment with the joint capsule primarily using closed reduction, with or without traction; internal fixation may be necessary if closed reduction fails to stabilize the joint and prevent recurrence

   Note: This most commonly occurs in the shoulder, but may also occur in the hip, ankle, knee, elbow, or thumb.

Information Sheet

26. Common orthopedic procedures performed on parts of the body

a. Hand

(1) Tendon grafts — Replacement of primarily flexor tendons lost to laceration or failed tendon repairs

(2) Peripheral nerve repair — Correction of loss of motor function or loss of sensation

(3) Palmar fasciectomy — Partial or total excision of the palmar fascia to treat Dupuytren's contracture which is a progressive disease causing the palmar fascia to constrict and eventually preventing the fingers from full extension

(4) Carpal tunnel release — Incision of the transverse carpal ligament to relieve the compression of the median nerve within the carpal canal at the wrist

(5) Metacarpal arthroplasty — Total replacement of the metacarpal is achieved by resection of the metacarpal head and proximal phalanx with replacement by silicone rubber implants which have two stems and a hinge joint.

b. Shoulder

(1) Bristow procedure — Detachment of the coracoid process and the attached muscles and insertion onto the neck of the glenoid cavity, where they are held with a screw; performed for recurrent dislocation of the shoulder

(2) Repair of an AC separation — Insertion of a Bosworth coracoclavicular screw through the clavicle and into the coracoid process to reduce the acromioclavicular separation and to stabilize the joint

(3) Rotator cuff repair — Detachment of the muscles from the scapula and clavicle to repair torn tendons from the muscles of the humerus. Small tears are repaired with heavy nonabsorbable suture; large tears are repaired by attaching the tendons through drill holes using cotton or synthetic sutures.

(4) Total shoulder arthroplasty — Total replacement of the shoulder is achieved by resection of the humeral head and resurfacing the glenoid cavity and the articular surface of the scapula and implantation of a metal humeral head and plastic glenoid socket.

Information Sheet

c. Elbow

(1) Ulnar nerve transposition — The ulnar nerve is freed from its groove at the back of the medial epicondyle of the humerus and then brought to the front of the condyle.

(2) Total elbow arthroplasty — The proximal ulna and distal humerus are resected and replaced with metallic components which may or may not be cemented in place.

d. Total wrist arthroplasty — Total replacement of the wrist achieved by resection of the scaphoid, lunate, and trapezium bones and implanting silicone rubber prostheses

e. Total hip arthroplasty — Total replacement of the hip joint with an acetabular cup and a femoral head prosthesis made specifically to fit the cup

f. Knee

(1) Patellectomy — Removal of the entire patella

(2) Repair of collateral or cruciate ligament tears — Reconstruction of ligaments with nonabsorbable sutures, wires, staples, and grafts

Examples: ACL repair, PCL repair

Note: Grafts may be autographs, allografts, or synthetic (Dacron, polyester, or Gortex) grafts.

(3) Baker's cyst excision — Removal of a cyst from the popliteal fossa

(4) Meniscectomy — Removal of the medial or lateral meniscus; usually performed by arthroscopy

(5) Total knee arthroplasty — Total replacement of the knee joint with a distal femoral component articulating with a proximal tibial component

g. Ankle and/or foot

(1) Triple arthrodesis — Fusion of the talocalcaneal, talonavicular, and calcaneocuboid joints performed by using bone graft, compression plates, and/or bone staples

Note: Arthrodesis may be performed for deformities (club foot or rheumatoid arthritis), stabilization of the joint, or relief of pain resulting from degenerative or traumatic arthritis.

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(2) Total ankle arthroplasty — Total replacement of the ankle joint with a distal tibial component articulating with a talus component

Note: Total ankle arthroplasties are inherently unstable and are cemented in place.

(3) Bunionectomy — Removal of exostosis and attempt to realign the great toe by removal of bone, transfer of tendons, and osteotomy of the first metatarsal shaft

(4) Correction of hammer toe deformity — Correction is made by incising the long extensor tendon to the toes and fusing the middle joint

(5) Total metatarsal arthroplasty — Total replacement of the metatarsal joint is achieved by resection of the proximal phalanx and exostosis of the metatarsal head with replacement by silastic implants

h. Vertebral column

(1) Laminectomy — Removal of bony fragments or an intervertebral disc exerting pressure on the spinal cord or nerve roots

(2) Spinal fusion — Fusion of vertebral bodies to stabilize the vertebral motor unit with bone graft from iliac crest

(3) Discectomy — Removal of the nucleus pulposus or the ruptured portion of the annulus fibrosis

Orthopedic Surgery
Unit 10

Student Supplement 1—Review Orthopedic Terminology

Name ______________________________ Date ____________________

Directions: Using the clues given below, complete the crossword puzzle by placing the appropriate name in the spaces provided. When you have completed this task, ask your instructor to check your answers.

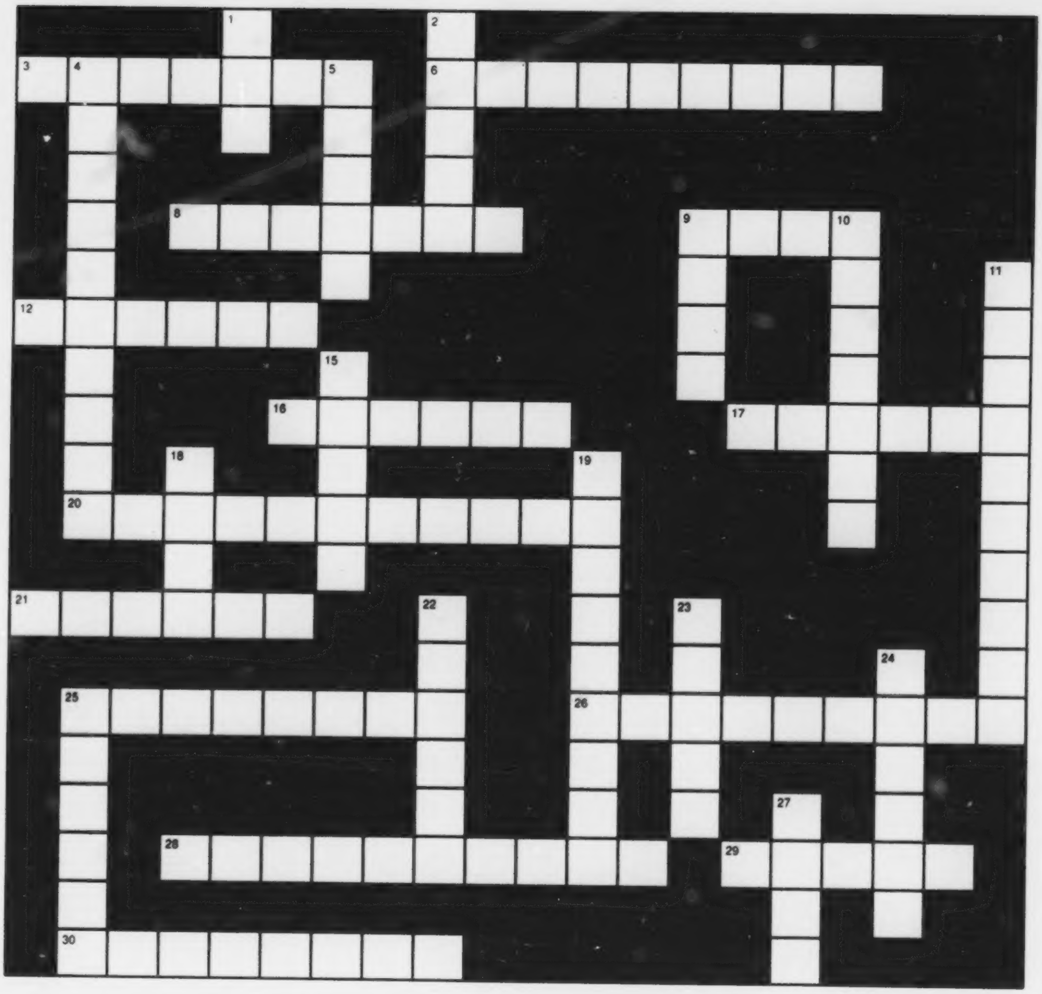
ACROSS CLUES

3. Palm of the hand turned down
6. Surgical cutting of bone
8. Promotes hemostasis of bone
9. A type of reduction
12. Used to form a hollow area in a bone
16. Used to insert plates
17. Used to insert nails
20. Coming from the ends of bone fragments
21. Farther away from an area under consideration
25. Nearer to the area under consideration
26. Bone preserved for later use
28. Incomplete fracture, partially bent, partially broken
29. Bent inward
30. Bone type that forms the outer covering of bone

DOWN CLUES

1. Used to cut apart bone
2. A shallow depression in a bone
4. New connective tissue cells used to form mature bone
5. A type of intramedullary nail
9. A fracture in which the bone breaks the surface of the skin
10. Condition of being bent
11. Used to keep the operative field free from blood
15. Used to cut out portions of bone
18. Rigid dressing used to fixate a fracture
19. A type of tourniquet
22. Transverse fracture at distal end of radius
23. The palmar surface
24. Bent outward
25. ______ girdle supports the trunk and provides attachment for the lower extremities
27. Used to smooth rough bone surface

Student Supplement 1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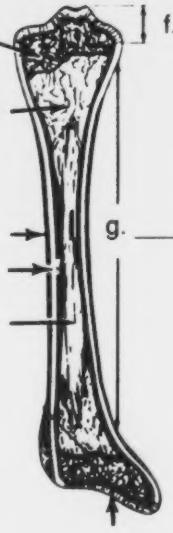
Orthopedic Surgery
Unit 10

Student Supplement 2—Review Identification of Long Bone Structures

Name ______________________________ Date ____________________

Directions: Identify the following parts of a long bone: diaphysis, epiphysis, articular cartilage, periosteum, medullary cavity (marrow), endosteum, compact bone, and cancellous bone.



a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________

Orthopedic Surgery
Unit 10

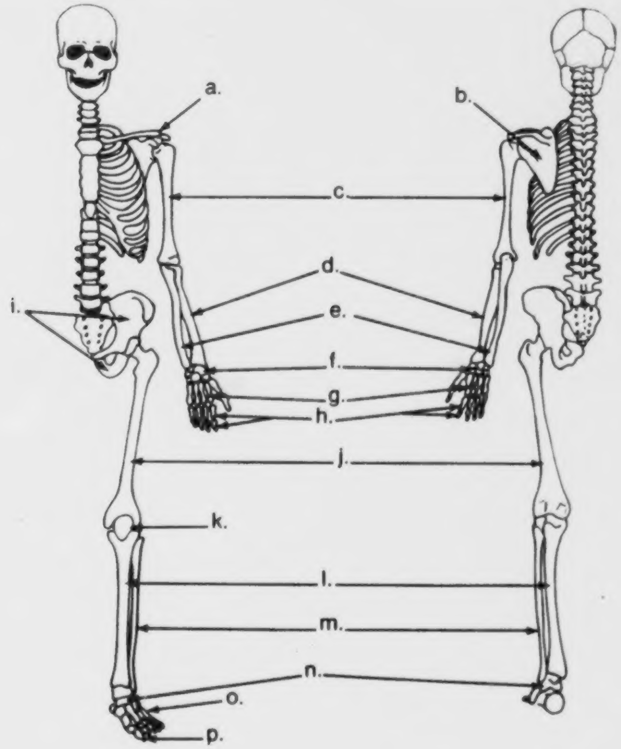
Student Supplement 3—Review Identification of Bones of the Appendicular Skeleton

Name ______________________ Date ______________

Directions: Identify the bones in the following illustration and place your answers in the blanks provided.

a. ______________
b. ______________
c. ______________
d. ______________
e. ______________
f. ______________
g. ______________
h. ______________

i. ______________
j. ______________
k. ______________
l. ______________
m. ______________
n. ______________
o. ______________
p. ______________



Orthopedic Surgery
Unit 10

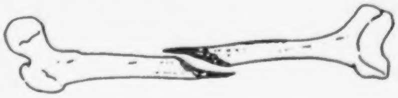
Assignment Sheet 1—Determine Needs For Given Orthopedic Surgery Cases

Name ______________________________ Overall Rating ______________

Evaluation criteria	**Rating**
Answers are appropriate for cases given	______
Words are spelled correctly	______

Directions: Read each of the following cases and fill in the blanks with the appropriate information required. Refer to the information sheets as needed.

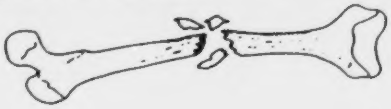
Case A: A 12-year-old male is scheduled to have a fracture of the right radius reduced and fixated. The fracture appears as follows:



1. The diagnosis is ______________________________
2. The procedure is called ______________________________
3. Type of anesthesia most likely to be used is ______________________________
4. The type of fixation device to be used will most likely be ______________________________
____
5. List two supplies needed for the fixation.
    a. ______________________________
    b. ______________________________
6. Describe two special considerations involving care of this patient.
    a. ______________________________
    b. ______________________________

Assignment Sheet 1

Case B: A 26-year-old female is scheduled to have a fracture of the right tibia reduced and fixated. The fracture appears as follows:



1. The diagnosis is ______
2. The procedure is called ______
3. The position of the patient will be ______
4. Type of anesthesia most likely to be used is ______
5. Describe the procedures involved in skin preparation.

   ______

   ______

6. Describe the draping procedure.

   ______

   ______

7. The type of fixation devices to be used will most likely be ______

   ______

8. List two special supplies and equipment needed for the procedure.
   a. ______
   b. ______
9. List at least three special instruments that will most likely be used.
   a. ______
   b. ______
   c. ______
10. Describe three special considerations involving care of this patient.
    a. ______
    b. ______
    c. ______

Assignment Sheet 1

Case C: A 73-year-old female is scheduled to have a non-displaced fracture of the left femoral neck reduced and fixated.

1. The procedure is called ____________________
2. The type of O.R. table used is ____________________
3. The position of the patient will be ____________________
4. Type of anesthesia most likely to be used is ____________________
5. Describe the procedure involved in skin preparation.

   ____

   ____

6. Describe the draping procedure.

   ____

   ____

7. The type of fixation devices to be used will most likely be ____________________

   ____

8. List two special supplies and equipment needed for the procedure.
   a. ____________________
   b. ____________________
9. List three special instruments that will most likely be used.
   a. ____________________
   b. ____________________
   c. ____________________
10. Describe three special considerations involving care of this patient.
    a. ____________________
    b. ____________________
    c. ____________________

Orthopedic Surgery
Unit 10

Job Sheet 1—Position a Pneumatic Tourniquet Cuff

Name ______________________ Attempt Number ________

Date ______________________ Overall Rating ________

Evaluation criteria	**Rating**
Assembled appropriate equipment	______
Selected proper tourniquet size	______
Wrapped webril smoothly	______
Secured cuff over webril	______
Checked cuff security	______
Checked for no binding	______

Evaluator's comments: ______________________

____

____

Instructions: When you are ready to perform this task, ask your instructor to observe the procedure and rate your performance using the evaluation criteria. Have your equipment ready.

A. Equipment and materials

Pneumatic cuff of selected size
Webril, soft roll, or similar sheet wadding

B. Procedure

☐ 1. Wrap several thicknesses of Webril or soft roll around the extremity as close to the trunk as possible.

☐ 2. Check to make sure wrapping is smooth and wrinkle free.

☐ 3. Place cuff over Webril.

Job Sheet 1

☐ 4. Secure cuff with Velcro closures and tie in place as close to the trunk as possible.

Note: Cuff ends must overlap 2 to 3 inches.

☐ 5. Check to make sure cuff is secure, but **not binding**.

Note: It is especially important to make sure there is no binding in the scrotal area of male patients when using the leg tourniquet.

Neurosurgery
Unit 11

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match cranial, spinal, and peripheral neurosurgical procedures with the correct descriptions and determine needs for given neurosurgical cases. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to neurosurgery with their correct definitions.
2. List indications for neurosurgery.
3. Match neurologic conditions and anomalies with the correct descriptions.
4. Match neurologic diagnostic procedures with the correct descriptions.
5. Complete statements concerning special equipment and supplies used in neurosurgery.
6. Distinguish between mechanical and chemical methods of hemostasis used during neurosurgery.
7. State positions that may be used for various neurosurgical procedures.
8. Select true statements concerning special considerations of neurosurgical procedures.
9. Match cranial neurosurgical procedures with the correct descriptions.
10. Complete statements concerning the procedure for a craniotomy.
11. Complete statements concerning spinal neurosurgical procedures and their descriptions.
12. Complete statements concerning the procedure for an anterior cervical laminectomy and fusion.
13. Complete statements concerning surgical procedures involving peripheral nerves.

Objective Sheet

14. List specialized instruments used in neurosurgery.
15. Determine needs for given neurosurgical cases. (Assignment Sheet 1)

Neurosurgery
Unit 11

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Spinal Cord and Meninges (Objective 1)
   TM 2—Coronal Section of Head (Objective 1)
   TM 3—Nucleus Pulposus—Disc (Objective 1)
   TM 4—Sagittal Section of Head (Objective 1)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. These could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

Suggested Activities

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to neurosurgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in neurosurgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in neurosurgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

5. Discuss the different names that an instrument may have. Instrument names vary between companies, between regions, and even between hospitals in the same region. Also surgeons may call an instrument by a different name from what is given in a catalog. This makes instrument identification more difficult. Good communication is vital between surgical team members to make sure the surgeon receives the instrument he/she expects. **Communication skills, adaptability skills**

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used in neurosurgery. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organization effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in neurosurgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about neurosurgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in neurosurgery. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

Suggested Activities

9. Divide students into groups, and assign each group a different procedure commonly performed in neurosurgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic set ups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

10. Show videos of procedures common to neurosurgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice of neurosurgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology.* Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Activities

Suggested Supplemental Resources

1. *Intraoperative Nursing Care of the Adult Craniotomy Patient*, DG-1554. 1986. 25-minute film that demonstrates positioning, prepping, and draping; instrumentation; and immediate postoperative evaluation of the neurosurgical patient.

2. *Endoscopic Carpal Tunnel Release: The Two-Portal Subligamentous Technique*, ACS-1762. 1992. 7-minute videotape that depicts a closed/endoscopic technique for surgical release of the carpal tunnel.

3. *Transsphenoidal Surgery for Pituitary Disorders*, DG-1733. 1992. 24-minute videotape that describes this surgical technique for treating pituitary tumors and associated lesions.

   1 - 3 are available from:

   Davis and Geck Video Library
   c/o Cine-Med
   127 Main Street North
   P.O. Box 745
   Woodbury, CT 06798
   800-633-0004 or 203-263-0080

4. *Nursing Management of Acute Head Injuries*, 28-minute videotape that shows various head injuries, neurological assessment, and methods of treatment.

5. *Complications of Spinal Cord Impairment*, 28-minute videotape that shows techniques for immobilizing a patient's spine and common injuries that may cause partial or complete spinal cord impairment.

6. *Nursing Management of Increased Intracranial Pressure*, 28-minute videotape that explains intracranial pressure with graphics for additional explanation. Features nursing care.

   4 - 6 are available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL AJN

Suggested Activities

7. *Infant Skull Surgery*, 120-minute videotape that shows a combination of neurosurgery and plastic surgery used to treat craniosynostosis and plagiocephaly. Available from:

PBS Video
1320 Braddock Place
Alexandria, VA 22314-1698
800-424-7963

Neurosurgery
Unit 11

Answers to Student Supplements

Student Supplement 1

a. Cerebrum
b. Pons
c. Cerebellum
d. Sella turcica
e. Pituitary gland
f. Pia mater
g. Dura mater
h. Skull
i. Scalp
j. Lateral
k. Third
l. Fourth

Student Supplement 2

a. Intervertebral disc
b. Body of vertebra
c. Spinal cord
d. Pia mater
e. Arachnoid
f. Dura mater
g. Spinal foramen
h. Vertebral processes

Neurosurgery
Unit 11

Answers to Assignment Sheet 1

Case A: Craniotomy

1. Any two of the following:
   - a. Angiography
   - b. CT scan
   - c. Electroencephalography
   - d. Echoencephalography
   - e. MRI
   - f. Ventriculography
   - g. Others as appropriate

2. Any two of the following:
   - a. Tumor
   - b. Abscess
   - c. Aneurysm
   - d. Hematoma
   - e. Swelling or pressure
   - f. Artery occlusion
   - g. Others as appropriate

3. Sitting

4. Any one of the following:
   - a. Mayfield
   - b. Gardner
   - c. Others as appropriate

5. a. Any two of the following: (Mechanical)
      - (1) Gauze sponges
      - (2) Scalp clips
      - (3) Bone wax
      - (4) Monopolar and/or bipolar electrocoagulation
      - (5) Compressed rayon cotton sponges (cottonoids)
      - (6) Hemostatic (ligating) clips
      - (7) Cyrosurgery

Answers to Assignment Sheet 1

b. Any two of the following: (Chemical)

  (1) Gelfoam®
  (2) Topical thrombin
  (3) Surgicel®
  (4) Oxycel®
  (5) Avitene®

6. Instructor should evaluate for completeness and appropriate arrangement.

Case B: Anterior cervical laminectomy with fusion

1. Any two of the following:

  a. CT scan
  b. MRI
  c. Myelography
  d. Lumbar puncture
  e. Others as appropriate

2. Neck and iliac crest

3. Any two of the following:

  a. Hudson brace with Cloward dowel cutter
  b. Osteotome and mallet
  c. Others as appropriate

4. Any two of the following:

  a. Pituitary rongeur
  b. Fine curettes
  c. Others as appropriate

5. Bleeding is controlled with cotton strips, gelatin sponges, or thrombin-soaked cotton pledgets. Never use bone wax in the disc area.

6. Instructor should evaluate for completeness and appropriate arrangement.

Neurosurgery
Unit 11

Answers to Written Test

1.	a.	13	h.	15
	b.	8	i.	17
	c.	1	j.	11
	d.	6	k.	9
	e.	10	l.	3
	f.	4	m.	12
	g.	7	n.	19

2. Any three of the following:

   a. To remove pathological lesions
   b. To relieve pressure on brain or spinal cord due to disease or injury
   c. To relieve pain
   d. To relieve injured or diseased peripheral nerves
   e. To treat congenital anomalies

3.	a.	7	f.	2
	b.	16	g.	9
	c.	12	h.	13
	d.	6	i.	8
	e.	1	j.	5

4.	a.	1 or 3	d.	6
	b.	8	e.	4
	c.	9	f.	2

5. a. Surgical loupes or headlight
   b. Stop bleeding (coagulate)
   c. Headrests or skull clamps
   d. Mayfield
   e. Compressed nitrogen or electricity

6.	a.	M	g.	C
	b.	C	h.	M
	c.	M	i.	C
	d.	C	j.	M
	e.	M	k.	C
	f.	M		

7. a. Sitting
   b. Lateral recumbent, modification of prone, or knee-chest (occasionally)
   c. Supine

Answers to Written Test

8. a. T d. T
   b. F e. F
   c. T f. T

9. a. 5 d. 1
   b. 3 e. 6
   c. 7 f. 2

10. a. 2
    b. 1
    c. 3

11. a. Vertebral laminae; any one of the following:

        (1) Herniated disc (nucleus pulposus)
        (2) Spinal cord tumor
        (3) Meningocele
        (4) Compression fracture or dislocation
        (5) Spinal cord injuries due to trauma

    b. Bone grafts
    c. Intractable pain

12. a. 2 d. 3
    b. 2 e. 3
    c. 4 f. 4

13. a. Axon
    b. Median
    c. Pain
    d. Lower

14. Any two of the following for **each** type:

    a. Small retractors

        (1) Vein (and nerve) retractors (Cushing, Sachs)
        (2) Decompression retractors (Cushing)
        (3) Nerve separator-spatulas (Sachs, Davis)
        (4) Nerve root retractors (Love, Scoville)
        (5) Periosteal elevators (Cushing "Little Joker", Freer, Adson)
        (6) Penfield dissectors
        (7) Hooks—Dura hooks (Cushing, Frazier, Adson) and nerve hooks (Dandy, Smithwick)
        (8) Brain spatula (Scoville, Cushing)

Answers to Written Test

b. Rongeurs

(1) Standard rongeur (Beyer, Ruskin, Stille-Luer)
(2) Cranial rongeur (Adson, DeVilbiss)
(3) Laminectomy rongeur (Leksell, Smith-Petersen, Fulton, Hajek-Kofler)
(4) Duckbill rongeur (Echlin, Stille-Luer)
(5) Cervical rongeur (Schlesinger, Spurling-Kerrison, Love-Kerrison)
(6) Pituitary rongeur (Cushing, Love-Gruenwald, Spurling, Cloward, Schlesinger)

c. Spoons and curettes

(1) Pituitary spoons (Cushing)
(2) Ruptured disc curettes (Scoville)
(3) Spinal fusion curettes (Hibbs, Spratt)
(4) Bone curettes (Spratt, Brun)

Neurosurgery
Unit 11

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

______a. Center cushioning of gelatinous mass lying within an intervertebral disc

______b. Removal of pressure

______c. Device placed on an aneurysm to prevent hemorrhage yet allow collateral blood flow

______d. Prefix pertaining to the skull

______e. Flattened part of either side of the arch of a vertebra

______f. Watery fluid protecting the brain and spinal cord

______g. Lines to monitor pressure within the venous system

______h. Device placed on scalp edge for hemostasis

______i. 31 pairs of nerves that carry messages to and from the spinal cord

______j. Tough, 3-layered membrane protecting the spinal cord and the brain; consists of the dura mater, arachnoid, and pia mater

______k. Epicranial aponeurosis which connects the bellies of the occipitofrontal muscles

______l. Parasympathetic and sympathetic nerves concerned with control of involuntary body functions

1. Aneurysm clip
2. Arterial lines
3. Autonomic nerves
4. Cerebrospinal fluid
5. Cranial nerves
6. Cranio
7. CVP lines
8. Decompression
9. Galea
10. Lamina
11. Meninges
12. Neuro
13. Nucleus pulposus
14. Peripheral nerves
15. Scalp clip
16. Sella turcica
17. Spinal nerves
18. Trephination
19. Ventricle

Written Test

______m. Combining form pertaining to a nerve, nervous tissue, or nervous system

______n. One of the cavities of the brain

2. List three indications for neurosurgery.

a. ______________________________

b. ______________________________

c. ______________________________

3. Match neurologic conditions and anomalies on the right with the correct descriptions.

______a. Rupture of the fibrocartilage surrounding an intervertebral disc, releasing the nucleus pulposus that cushions the vertebrae above and below with resulting pressure on the spinal nerve roots and pain

______b. Neurologic condition of the trigeminal facial nerve, characterized by paroxysms of flashing, stablike pain radiating along the course of any of the three branches of the nerve

______c. Congenital hernia with the meninges protruding through an opening of the skull or spinal column

______d. Tumor or swelling that contains blood

______e. Thin-walled vascular channels that connect arteries and veins without the usual intervening capillaries; may give rise to intracerebral hemorrhage

1. A-V malformations
2. Brain abscess
3. Brain tumor
4. Carpal tunnel syndrome
5. Craniosynostosis
6. Hematoma
7. Herniated disc
8. Hydrocephalus
9. Intracranial aneurysm
10. Intractable pain
11. Ménière's disease

Written Test

______f. Localized collection of pus in the intracranial region usually occurring secondary to infections of the middle ear, nasal sinuses, face, or skull, or from contamination from penetrating wounds or skull fractures

______g. Localized abnormal dilation of a blood vessel in the skull; may be due to a congenital defect or weakness of the wall of the vessel

______h. Benign or malignant tumor that presses on the optic chiasm and impairs vision and may cause symptoms of acromegaly

______i. Increased accumulation of cerebrospinal fluid within the ventricles of the brain resulting from an interference with the normal circulation and absorption of the fluid

______j. Premature ossification of the sutures of the skull

12. Meningocele
13. Pituitary tumor
14. Spina bifida
15. Spinal cord tumor
16. Tic douloureux

4. Match neurologic diagnostic procedures on the right with the correct descriptions.

______a. X-rays are taken after injection of a contrast medium into the intracranial vessels; helps visualize aneurysms, tumors, or other vascular lesions

______b. Contrast medium is injected into the subarachnoid space of the spinal canal to visualize a herniated disc, tumor, or other abnormality

______c. Air is injected through a lumbar puncture into the subarachnoid space; x-rays are taken to reveal the outline of the ventricular system and subarachnoid cisterns

1. Cerebral angiography
2. Computed tomography scan
3. Digitalized angiography
4. Echoencephalography
5. Electroencephalography

Written Test

______d. Needle puncture is made into the subarachnoid space, usually between the 3rd and 4th or 4th and 5th lumbar vertebrae performed for various reasons

______e. Ultrasonic waves are used to detect brain tumors, hematomas, swelling, or abscesses

______f. Produces multiple sequential x-rays of the brain, spinal cord, or other areas of the body in transverse (cross) sections

6. Lumbar puncture
7. Magnetic resonance imaging
8. Myelography
9. Pneumoencephalography
10. Ventriculography

5. Complete the following statements concerning special equipment and supplies used in neurosurgery by correctly filling in the blanks.

   a. __________________ — Used by the surgeon when less magnification than a microscope is needed

   b. Electrosurgical unit/Bipolar unit — Used to __________________ in the galea, periosteum, the surface of the dura, the spinal cord, and in the brain

   c. __________________ — Used to securely position or fixate the skull during a cranial or cervical spine operation

   d. __________________ table — Large overhead instrument table used in place of the Mayo stand which is positioned over the patient and can be raised or lowered to provide best location for passing instruments

   e. Drills and perforators — Used for drilling, cutting, shaping, and repairing bones; powered by __________________

6. Distinguish between mechanical and chemical methods of hemostasis used during neurosurgery by placing a "C" next to the chemical methods and an "M" next to the mechanical methods.

______a. Scalp clips

______b. Oxycel

______c. Gauze sponges

______d. Topical thrombin

Written Test

______e. Hemostatic (ligating) clips

______f. Compressed rayon cotton sponges (cottonoids)

______g. Gelfoam

______h. Monopolar and/or bipolar electrocoagulation

______i. Surgicel

______j. Bone wax

______k. Avitene

7. State one position that may be used for each of the following neurosurgical procedures.

a. Ventriculogram — ______________________________

b. Lumbar laminectomy — ______________________________

c. Supratentorial craniotomy — ______________________________

8. Select true statements concerning special considerations of neurosurgical procedures by placing a "T" next to the true statements and an "F" next to the false statements.

______a. Patient is usually catheterized to monitor urinary output and to allow continuous drainage of the bladder during lengthy procedures.

______b. Calcium chloride, a diuretic, may be given during brain surgery to prevent brain swelling and intracranial pressure.

______c. Arterial and CVP lines may be used to monitor the patient during the procedure.

______d. Hyperthermia unit may be used for some procedures.

______e. If the patient's hair is shaved in preparation for surgery, it is considered a specimen and is sent to pathology.

______f. Surgeon may assist with draping.

Written Test

9. Match cranial neurosurgical procedures on the right with the correct descriptions.

_______a. Performed to treat hydrocephalus by diverting excessive cerebrospinal fluid from cerebral ventricles to other body cavities where the fluid can be absorbed

_______b. Repair of a skull defect resulting from trauma, malformation, or a surgical procedure; involves covering the defect with some type of prosthetic material such as metal, methyl methacrylate, silicone rubber, or bone and cartilage

_______c. Removal of pituitary gland or pituitary gland tumor through an approach in which an incision is made in the upper gum margin and passes through the inferior nasal cavity and sphenoid sinus to the floor of the sella turcica

_______d. Holes drilled through the skull in order to perform one or more of the following: 1) Remove a collection of fluid beneath the dura mater; 2) Tap a ventricle to relieve pressure; 3) Aspirate a brain abscess and instill antibiotics; 4) Locate and drain a subdural hematoma; 5) Introduce air into the lateral ventricles for ventriculography

_______e. Accurate placement of a probe, needle, or electrode into a specific location in the brain in order to treat, biopsy, or destroy tissue in the target area; uses CT, MRI, or PET with x-rays and computer technology to identify the 3-axes coordinates of the target area

_______f. Incision into the skull and removal of bone in order to treat craniosynostosis in infants

1. Bur holes/trephination
2. Craniectomy
3. Cranioplasty
4. Craniotomy
5. Shunt operations
6. Stereotaxis
7. Transsphenoidal hypophysectomy

Written Test

10. Complete the following statements concerning the procedure for a craniotomy by placing the correct answers in the blanks provided.

______a. Periosteum is stripped from the bone with a

(1) Periosteal knife
(2) Periosteal elevator
(3) Scalpel
(4) Plain knife

______b. Bur holes are enlarged with a

(1) Rongeur
(2) Scalpel
(3) Knife
(4) Bur hole enlarger

______c. After exposing, the brain surface is protected with

(1) Moist gauze
(2) Bone wax
(3) Moist cottonoid strips
(4) Dry gauze

11. Complete the following statements concerning spinal neurosurgical procedures and their descriptions by correctly filling in the blanks provided.

a. Laminectomy — Removal of one or more __________________ to expose the spinal cord; commonly performed to treat one of the following: _______________

____

b. Removal of anterior cervical disc with fusion — Excision of one or more herniated cervical intervertebral discs and the placement of __________________ between the vertebrae to fuse them together.

c. Cervical cordotomy (rhizotomy) — Division of the spinothalamic tract to treat __________________

Written Test

12. Complete the following statements concerning the procedure for an anterior cervical laminectomy and fusion by placing the correct answers in the blanks provided.

______a. An anterior cervical laminectomy and fusion involves ______ operative site(s).

(1) 1
(2) 2
(3) 3
(4) 4

______b. A ______ incision is made over the involved disc space.

(1) Longitudinal
(2) Transverse
(3) Oblique

______c. What artery must be identified while trying to expose the vertebrae?

(1) Vesical
(2) Thoracic
(3) Transverse cervical
(4) Carotid

______d. Where is the bone graft commonly taken from?

(1) Clavicle
(2) Femur
(3) Iliac crest
(4) Rib

______e. Disc material is removed with fine curettes or a ______

(1) Mastoid rongeur
(2) Periosteal elevator
(3) Pituitary rongeur
(4) Osteotome

______f. Bleeding on the walls of the disc hole is controlled using any of the following methods **EXCEPT**:

(1) Cotton strips
(2) Thrombin-soaked cotton pledgets
(3) Gelatin sponge
(4) Bone wax

Written Test

13. Complete the following statements concerning surgical procedures involving peripheral nerves by circling the correct answers.

    a. Peripheral nerve repair (Neurorrhaphy) — Restoration of continuity of a nerve for regeneration of (axon, dendrite) fibers following a peripheral nerve injury

    b. Carpal tunnel release — Decompression of the (carpal, median) nerve by removing part of the roof of the fibrous sheath of the transverse carpal ligament, or removal of the lunate bone or volar carpal ganglion

    c. Ulnar nerve transposition — Involves surgically changing the position of the ulnar nerve which has caused (pain, numbness) and discomfort because of traumatic or anatomical problems

    d. Lumbar sympathectomy — Excision of a segment of the lumbar sympathetic chain to treat vasospastic disorders and selected cases of peripheral vascular insufficiency; results in increased circulation to the (upper, lower) extremities

14. List two examples of each of the following specialized instruments used in neurosurgery.

    a. Small retractors

        (1) ______________________________

        (2) ______________________________

    b. Rongeurs

        (1) ______________________________

        (2) ______________________________

    c. Spoons and curettes

        (1) ______________________________

        (2) ______________________________

***Permission to duplicate this test is granted.**

Neurosurgery
Unit 11

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Neurosurgical Cases Rating _____

Comments: ____

____

Written Test Scores

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

*Permission to duplicate this form is granted.

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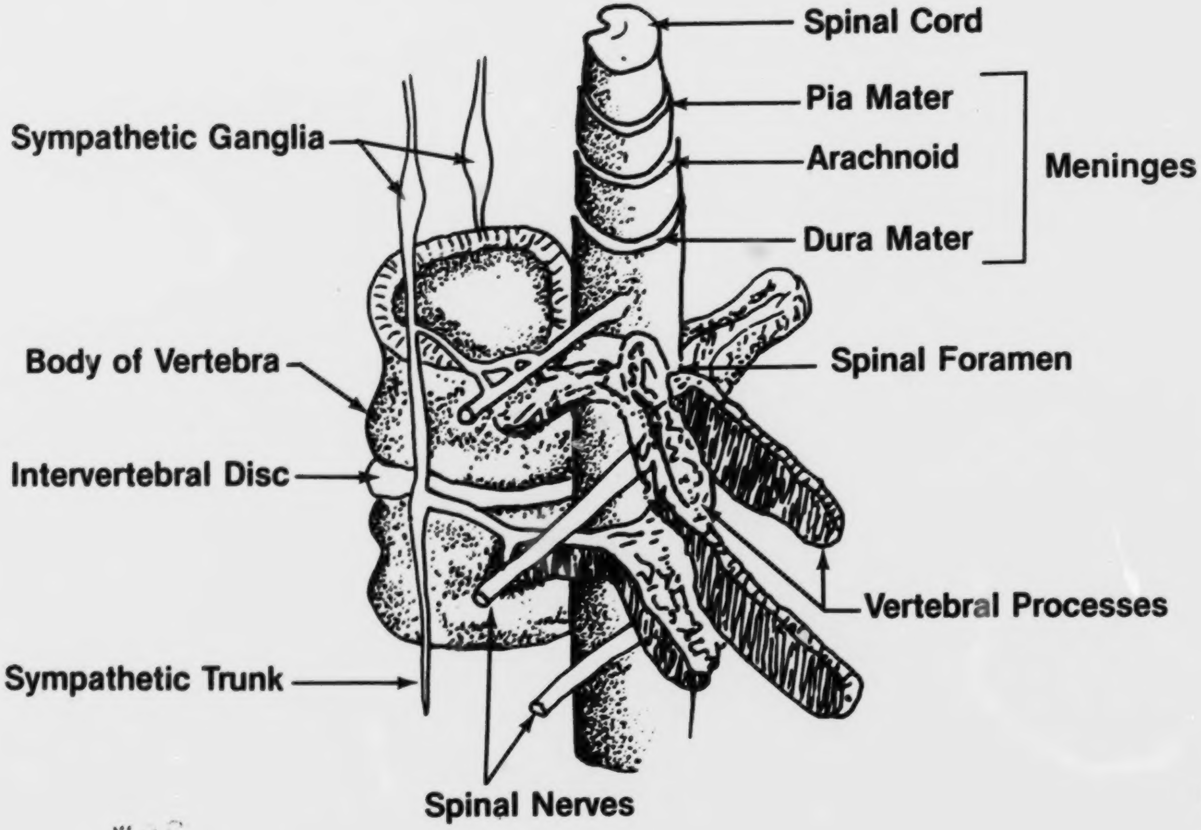
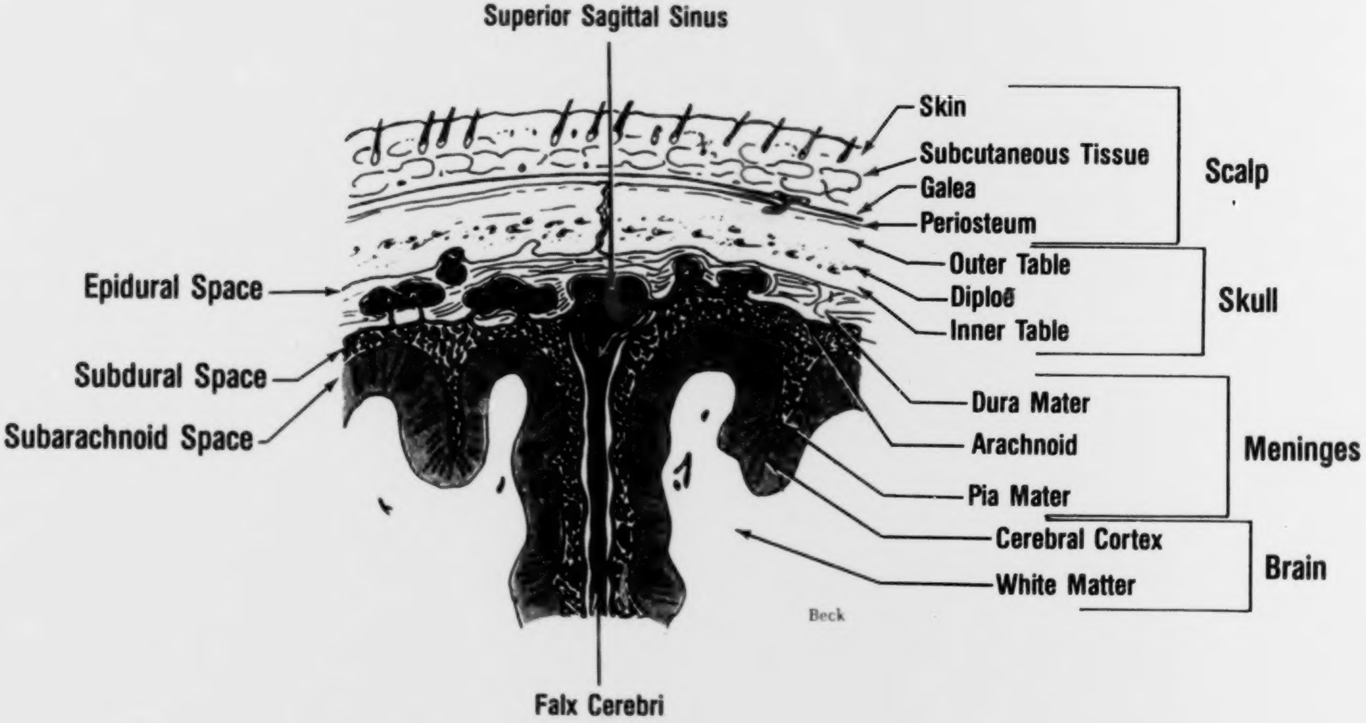
Spinal Cord and Meninges

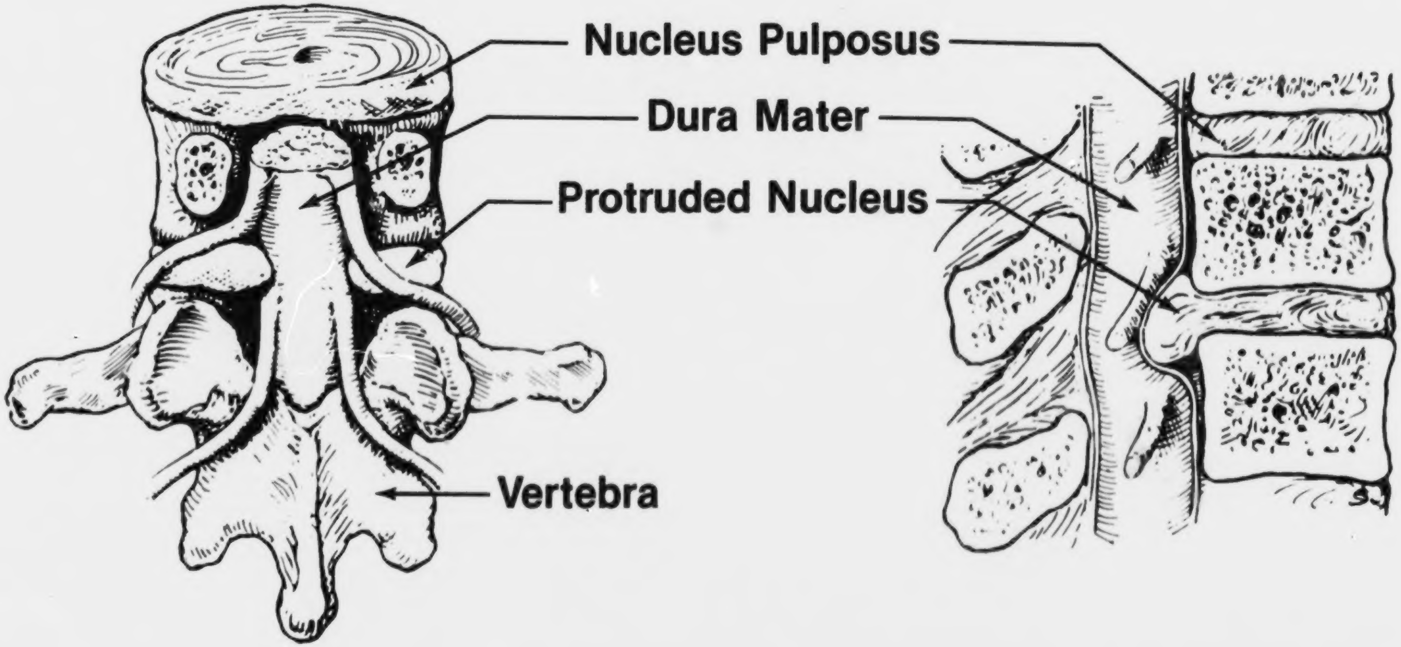


Spinal Cord
Pia Mater
Arachnoid
Dura Mater
Meninges
Sympathetic Ganglia
Body of Vertebra
Spinal Foramen
Intervertebral Disc
Vertebral Processes
Sympathetic Trunk
Spinal Nerves

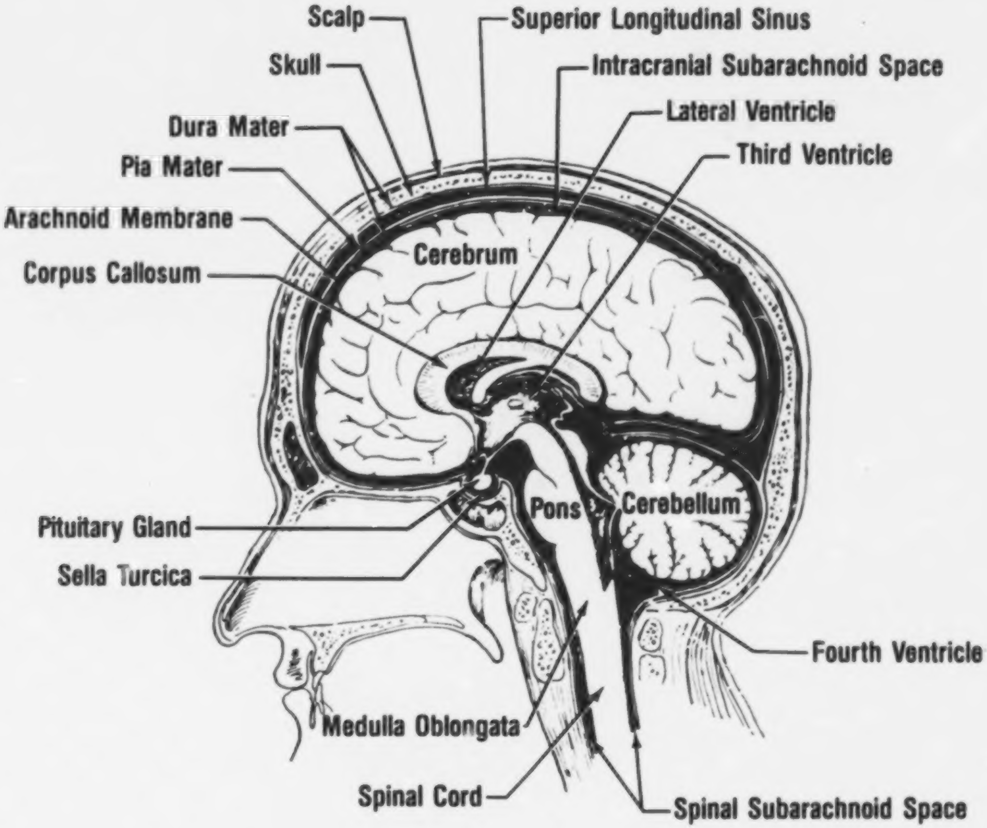
Coronal Section of Head


Superior Sagittal Sinus
Skin
Subcutaneous Tissue
Galea
Periosteum
Scalp
Outer Table
Diploë
Inner Table
Skull
Epidural Space
Subdural Space
Subarachnoid Space
Dura Mater
Arachnoid
Pia Mater
Meninges
Cerebral Cortex
White Matter
Brain
Beck
Falx Cerebri

Nucleus Pulposus (Disc)


Nucleus Pulposus
Dura Mater
Protruded Nucleus
Vertebra

Sagittal Section of Head


Scalp
Superior Longitudinal Sinus
Skull
Intracranial Subarachnoid Space
Lateral Ventricle
Dura Mater
Third Ventricle
Pia Mater
Arachnoid Membrane
Cerebrum
Corpus Callosum
Pituitary Gland
Pons
Cerebellum
Sella Turcica
Fourth Ventricle
Medulla Oblongata
Spinal Cord
Spinal Subarachnoid Space

Surgical Procedures, Unit 11
Teacher Page 33

Neurosurgery
Unit 11

Information Sheet

1. **Terms and definitions**

   a. **Aneurysm clip** — Device placed on an aneurysm to prevent hemorrhage yet allow collateral blood flow

   b. **Arterial lines** — Lines to monitor blood pressure within the arterial system

   c. **Autonomic nerves** — Parasympathetic (craniosacral) and sympathetic (thoracolumbar) nerves concerned with control of involuntary body functions

   d. **Cerebrospinal fluid (CSF)** — Watery fluid protecting the brain and spinal cord

   e. **Cranial nerves** — 12 pairs of nerves that carry messages to and from the brain

   f. **Cranio** — Prefix pertaining to the skull

   g. **CVP (central venous pressure) lines** — Lines to monitor pressure within the venous system

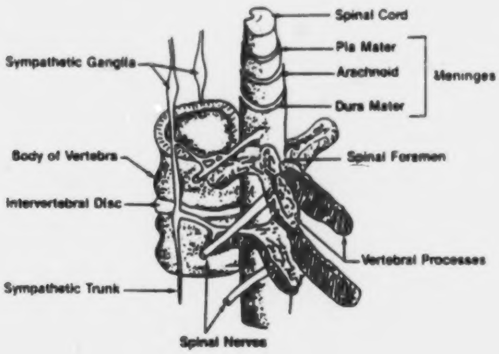
   h. **Decompression** — Removal of pressure

   i. **Galea** — Epicranial aponeurosis which connects the bellies of the occipitofrontal muscles

   j. **Lamina** — Flattened part of either side of the arch of a vertebra

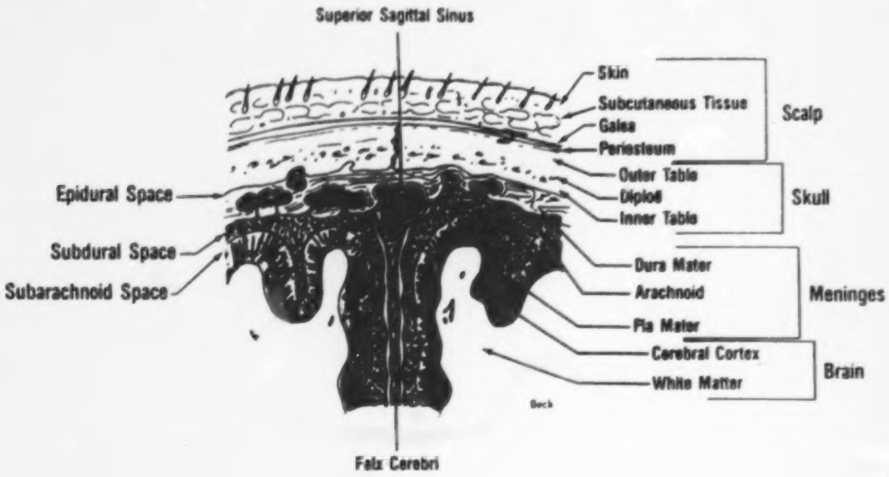
   k. **Meninges** — Tough, 3-layered membrane protecting the spinal cord and the brain; consists of the dura mater (external), arachnoid (middle), and pia mater (internal)

   Figure 1—Spinal cord and meninges


Spinal Cord
Pia Mater
Arachnoid
Dura Mater
Meninges
Sympathetic Ganglia
Body of Vertebra
Intervertebral Disc
Spinal Foramen
Vertebral Processes
Sympathetic Trunk
Spinal Nerves

Information Sheet

Figure 2—Scalp, skull, meninges, and brain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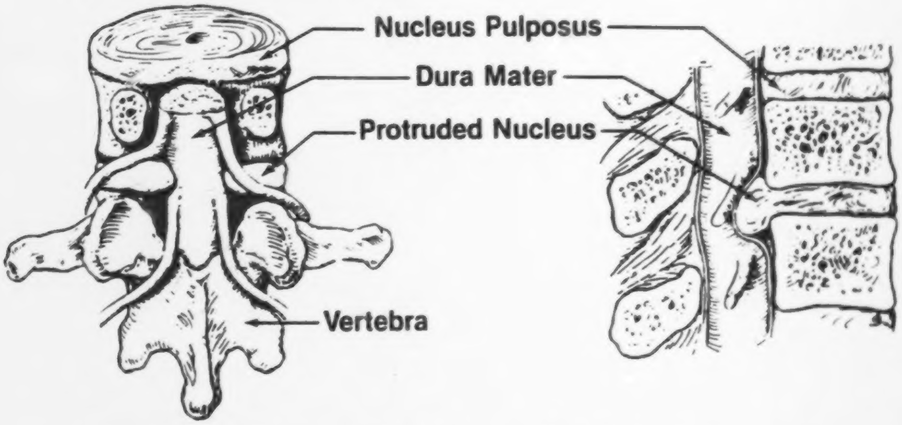
Dura Mater
Arachnoid
Pia Mater
Meninges
Cerebral Cortex
White Matter
Brain
Beck
Falx Cerebri

l. **Neuro** — Combining form pertaining to a nerve, nervous tissue, or nervous system

m. **Nucleus pulposus** — Center cushioning of gelatinous mass lying within an intervertebral disc (or disk)

Figure 3—Nucleus pulposus (disc)


Nucleus Pulposus
Dura Mater
Protruded Nucleus
Vertebra

n. **Pericranium** — Fibrous membrane surrounding the cranium; periosteum of the skull

o. **Peripheral nerves** — Nerves that connect the brain or spinal cord with peripheral receptors or effectors; includes cranial nerves, spinal nerves, and autonomic nerves

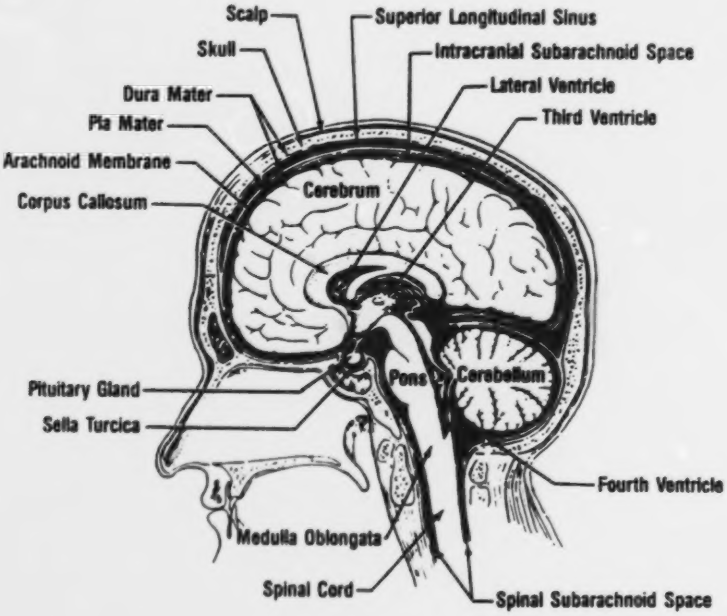
Information Sheet

p. **Scalp clip** — Device placed on scalp edge for hemostasis

q. **Sciatica pain** — Severe pain in the leg along the course of the sciatic nerve felt at back of thigh running down the inside of the leg

r. **Sella turcica** — Concavity in the superior surface of the body of the sphenoid bone that houses the pituitary gland

Figure 4—Sagittal section of the head


Scalp
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Corpus Callosum
Cerebrum
Pituitary Gland
Pons
Cerebellum
Sella Turcica
Fourth Ventricle
Medulla Oblongata
Spinal Cord
Spinal Subarachnoid Space

s. **Spinal nerves** — 31 pairs of nerves that carry messages to and from the spinal cord

t. **Spinal tracts** — Ascending and descending pathways for motor or sensory nerve impulses found in the white matter of the spinal cord; ascending tracts conduct impulses up the spinal cord to the brain and descending tracts conduct impulses down the cord from the brain

Examples: Ascending — Spinothalamic and spinocerebellar tracts
Descending — Corticospinal and reticulospinal tracts

u. **Trephination** — Cutting out a circular piece of bone, usually the skull, with an enlarged surgical drill bit (trephine)

v. **Ventricle** — One of the cavities of the brain

Information Sheet

2. **Indications for neurosurgery**

   a. To remove pathological lesions

      Examples: Tumors, abscesses, aneurysms

   b. To relieve pressure on brain or spinal cord due to disease or injury

      Examples: Hydrocephalus, subdural hematoma, herniated disc, vertebral fracture

   c. To relieve pain

      Example: Sciatica pain due to herniated lumbar disc

   d. To relieve injured or diseased peripheral nerves

      Example: Carpal tunnel syndrome

   e. To treat congenital anomalies

      Examples: Craniosynostosis, meningocele, spina bifida

3. **Neurologic conditions and anomalies**

   a. **A-V (arteriovenous) malformations** — Thin-walled vascular channels that connect arteries and veins without the usual intervening capillaries; may give rise to intracerebral hemorrhage

   b. **Brain abscess** — Localized collection of pus in the intracranial region usually occurring secondary to infections of the middle ear, nasal sinuses, face, or skull, or from contamination from penetrating wounds or skull fractures

   c. **Brain tumor** — Growth of tissue forming an abnormal mass that may occur in any lobe or structure in the intracranial region

   d. **Carpal tunnel syndrome** — Painful disorder of the wrist and hand in which pressure is exerted on the median nerve at the point at which it goes through the carpel tunnel of the wrist

   e. **Craniosynostosis** — Premature ossification of the sutures of the skull

   f. **Hematoma** — Tumor or swelling that contains blood

      Example: Subdural hematoma (beneath the dura)
      Epidural hematoma (above the dura)

Information Sheet

g. **Herniated disc** — Rupture of the fibrocartilage surrounding an intervertebral disc, releasing the nucleus pulposus that cushions the vertebrae above and below with resulting pressure on the spinal nerve roots and pain

h. **Hydrocephalus** — Increased accumulation of cerebrospinal fluid within the ventricles of the brain resulting from an interference with the normal circulation and absorption of the fluid

i. **Intracranial aneurysm** — Localized abnormal dilation of a blood vessel in the skull; may be due to a congenital defect or weakness of the wall of the vessel

j. **Intractable pain** — Pain that cannot be easily relieved, such as that occurring from certain neoplastic invasions

k. **Ménière's disease (or syndrome)** — Disorder of the membranous labyrinth of the inner ear with symptoms including progressive deafness, tinnitus, dizziness, and a sensation of fullness or pressure in the ears

l. **Meningocele** — Congenital hernia with the meninges protruding through an opening of the skull or spinal column

m. **Pituitary tumor** — Benign or malignant tumor that presses on the optic chiasm and impairs vision and may cause symptoms of acromegaly

n. **Spina bifida** — Congenital defect in the walls of the spinal canal caused by lack of union between the lamina of the vertebrae

o. **Spinal cord tumor** — Growth of tissue forming an abnormal mass along the spinal cord

Note: 50% are extramedullary, 25% are intramedullary, and 25% are extradural.

p. **Tic douloureux (trigeminal neuralgia)** — Neurologic condition of the trigeminal facial nerve, characterized by paroxysms of flashing, stablike pain radiating along the course of any of the three branches of the nerve

Information Sheet

4. Neurological diagnostic procedures

Note: One or more of the following procedures may be performed to determine the location and type of neurological pathology present. The results should be available during surgery.

a. **Cerebral angiography**

(1) X-rays are taken after injection of a contrast medium into the vessels of the cranium.

(2) Helps visualize aneurysms, tumors, or other vascular lesions

b. **Computed (computerized) tomography (CT) scan**

(1) Produces multiple sequential x-rays of the brain, spinal cord, or other areas of the body in transverse (cross) sections

(2) The x-rays outline a picture of the structure to be studied.

c. **Digitalized angiography**

(1) Similar to a standard cerebral angiography except that a computer is used to convert conventional x-rays into video signals, then to digits, and then to an image on a television screen

(2) Creates a clear reconstruction of the vessel because the computer can subtract everything from the image except the contrast medium

d. **Echoencephalography**

(1) Ultrasonic waves are used to detect brain tumors, hematomas, swelling, or abscesses.

(2) Commonly used as an emergency diagnostic measure

e. **Electroencephalography (EEG)**

(1) Electric impulses emitted by brain cells are recorded by specialized equipment for interpretation of possible abnormalities in the central nervous system.

(2) The recording made on special paper results from the attachment of electrodes on the head of the patient.

Information Sheet

f. **Lumbar puncture**

(1) Needle puncture is made into the subarachnoid space, usually between the 3rd and 4th or 4th and 5th lumbar vertebrae.

(2) May be performed for one or more of the following reasons:

(a) To examine the cerebrospinal fluid

(b) To determine level of cerebrospinal fluid pressure

(c) To lower cerebrospinal fluid pressure by removing a volume of fluid

(d) To introduce anesthetics, medications, or contrast media

g. **Magnetic resonance imaging (MRI)**

(1) Uses electromagnetic energy and radio waves to form images; does not use radiation

(2) Can detect tumors, inflammatory diseases, and infections, and help to prevent to evaluate cardiovascular and central nervous system functions

h. **Myelography**

(1) Contrast medium is injected into the subarachnoid space of the spinal canal to visualize a herniated disc, tumor, or other abnormality.

(2) Fluoroscopy is used during the procedure to locate the affected area; then spot films are taken as permanent records.

i. **Pneumoencephalography (PEG)**

(1) Air is injected through a lumbar puncture into the subarachnoid space.

(2) X-rays are taken to reveal the outline of the ventricular system and subarachnoid cisterns.

j. **Ventriculography**

(1) Air is introduced into the lateral ventricles, and x-rays are taken to diagnose tumors. Air makes the ventricles visible on x-rays.

(2) The air is introduced through small bur holes which are made through the skull.

Information Sheet

5. **Special equipment and supplies used in neurosurgery**

   a. **Operating microscope** — Enables the surgeon to perform delicate and precise microsurgical cranial, spinal, and peripheral nerve procedures

      Note: The microscope can be attached to a video camera, recorder, and television monitor for teaching purposes.

   b. **Surgical loupes and headlight** — Used by the surgeon when less magnification than a microscope is needed

   c. **Electrosurgical unit/Bipolar unit** — Used to stop bleeding in the galea, periosteum, the surface of the dura, the spinal cord, and in the brain

      Note: The bipolar unit provides a completely isolated output between the tips of the forceps. No grounding pad is needed if only the bipolar unit is used.

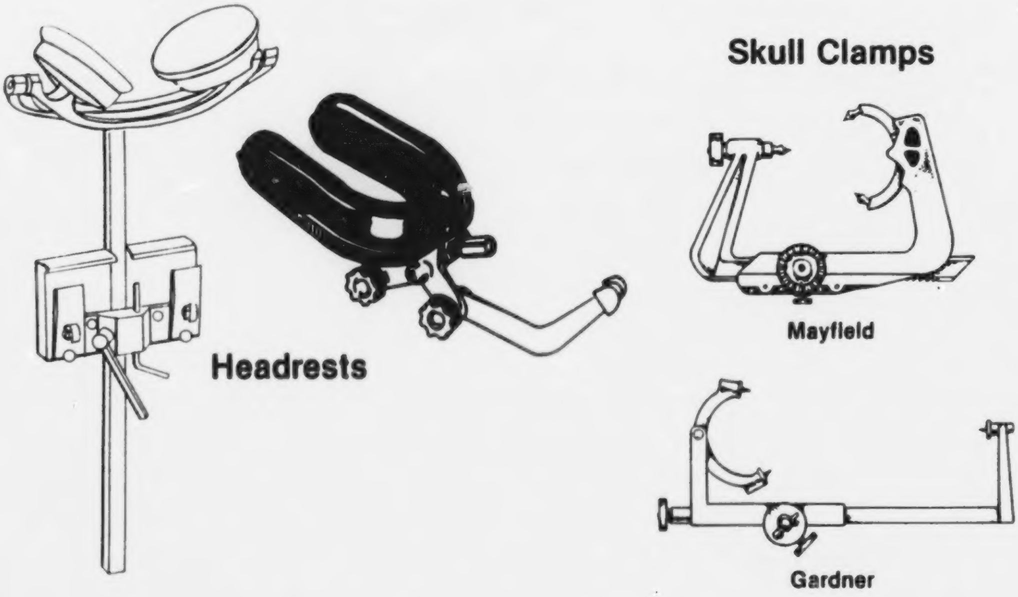
   d. **Ultrasonic aspirator** — Used to remove body tissue by fragmentation, irrigation, and suction

      Example: Cavitron Ultrasonic Surgical Aspirator (CUSA)

   e. **Headrests and skull clamps** — Used to securely position or fixate the skull during a cranial or cervical spine operation

      Note: Many types are available to position for different procedures.

Figure 5



Information Sheet

f. **Mayfield table** — Large overhead instrument table used in place of the Mayo stand which is positioned over the patient and can be raised or lowered to provide best location for passing instruments

g. **Drills and perforators**

   (1) Used for drilling, cutting, shaping, and repairing bones

   (2) Powered by compressed nitrogen or electricity

   Examples: Hall Air Drill, Neurairtome, Craniotome, Ronjair, Midas Rex

h. **Neurosurgical sponges (cottonoid strips or patties)**

   (1) Are radiopaque, felt-like sponges used during cranial and spinal operations

   (2) Strips are 3″ or 6″ long and ¼″ to 1″ wide.

   (3) Patties are ½″ × ½″, ¾″ × ¾″, 1 × 1″, and 3 × 3″.

   (4) Strips may or may not have strings (threads) attached. All patties should have strings attached.

   (5) Cottonoid sponges should be given to surgeon on flat metal plate and moistened with saline (or saline-thrombin) solution.

i. **Lasers**

   (1) Used for precise dissection, hemostasis, and tumor destruction

   (2) May be argon, CO_2, or Nd:YAG

   (3) Commonly used in conjunction with endoscopes, microscopes, and stereotaxis

Information Sheet

6. Hemostasis used during neurosurgery

Note: Meticulous hemostasis in neurosurgery is vital to minimize blood loss from the vascular scalp, skull, venous sinuses, and pia mater. The technologist must plan ahead and be well-prepared with necessary hemostatic instruments and supplies.

a. Mechanical methods of hemostasis

  (1) Gauze sponges

  (2) Scalp clips

  (3) Bone wax

  (4) Monopolar and/or bipolar electrocoagulation

  (5) Compressed rayon cotton sponges (cottonoids)

  (6) Hemostatic (ligating) clips

  (7) Cryosurgery

b. Chemical methods of hemostasis

  (1) Gelfoam®

  (2) Topical thrombin

  (3) Surgicel®

  (4) Oxycel®

  (5) Avitene®

7. Positions used for neurosurgical procedures

a. **Supine** — Used for supratentorial craniotomy, decompression procedures, and anterior cervical fusion

b. **Lateral recumbent** — Used by some surgeons for thoracic and lumbar laminectomies

c. **Modifications of prone** — Used for lumbar, cervical, and thoracic laminectomies and posterior fossa craniotomy

d. **Sitting** — Used for cervical laminectomy, posterior fossa craniotomy, temporal craniotomy, and ventriculogram

Information Sheet

e. **Extreme sitting** — Used for infratentorial cranial surgery and posterior cervical laminectomy

f. **Knee-chest** — Occasionally used for lumbar laminectomy

8. **Special considerations of neurosurgical procedures**

a. Patient is usually catheterized to monitor urinary output and to allow continuous drainage of the bladder during lengthy procedures.

b. Manitol, a diuretic, may be given during cranial surgery to prevent brain swelling and increased intracranial pressure.

c. Arterial and CVP lines may be used to monitor the patient during the procedure.

d. Hyperthermia unit may be used for some procedures.

e. If the patient's hair is shaved in preparation for surgery, it is considered the patient's personal belonging and is bagged and sent to the floor with the patient.

f. Surgeon may assist with draping, especially on complex procedures. Towels around operative site may be secured by towel clamps, staples, or sutures. Adhesive drape may also be used.

9. **Cranial neurosurgical procedures**

a. **Bur holes/trephination** — Holes are drilled through the skull in order to perform one or more of the following:

(1) Remove a collection of fluid beneath the dura mater

(2) Tap a ventricle to relieve pressure

(3) Aspirate a brain abscess and instill antibiotics

(4) Locate and drain a subdural hematoma

(5) Introduce air into the lateral ventricles for ventriculography

Note: Enlarged bur holes are referred to as trephination.

b. **Craniectomy** — Incision into the skull and removal of bone in order to treat craniosynostosis in infants

c. **Cranioplasty** — Repair of a skull defect resulting from trauma, malformation, or a surgical procedure; involves covering the defect with some type of prosthetic material such as metal, methyl methacrylate, silicone rubber, or bone and cartilage

d. **Craniotomy** — Incision into the cranium to perform one or more of the following:

   (1) Identify and ligate or clip an intracranial aneurysm

   (2) Shunt blood flow around an occluded portion of the internal carotid or middle cerebral artery

   (3) Remove tumors, subdural or epidural hematomas, scars, infections of the bone, or abscesses

   (4) Relieve pressure on the brain from depressed bone or internal hemorrhage

e. **Shunt operations** — Performed to treat hydrocephalus by diverting excessive cerebrospinal fluid from cerebral ventricles to other body cavities where the fluid can be absorbed

   (1) Ventriculoperitoneal (V-P) shunt — Excess cerebrospinal fluid is shunted to peritoneal cavity

   (2) Ventriculoatrial (V-A) shunt — Excess cerebrospinal fluid is shunted to right atrium of the heart

f. **Stereotaxis**

   (1) Accurate placement of a probe, needle, or electrode into a specific location in the brain in order to treat, biopsy, or destroy tissue in the target area

   (2) Uses CT, MRI, and/or PET (positron emission tomography) scans, in conjunction with x-rays and computer technology, to identify the 3-axes coordinates of the target area

   Note: Stereotaxis allows surgeons to reach areas that were previously too small or inaccessible. Endoscopes and lasers may also be used with stereotaxic equipment.

g. **Transsphenoidal hypophysectomy** — Removal of pituitary gland or pituitary gland tumor through a transsphenoidal approach

   Note: Incision is made in the upper gum margin and passes through the inferior nasal cavity and sphenoid sinus to the floor of the sella turcica which is opened to expose the pituitary gland. This procedure requires the use of an image intensifier and an operating microscope, and is performed by an ENT surgeon who enters and closes the cavity, and by a neurosurgeon who performs the hypophysectomy.

Information Sheet

10. Procedure for a craniotomy

a. The patient is positioned, prepped, and draped according to the location of the pathological condition and surgeon's preference.

Note: The surgeon may mark the incision line prior to the prep to aid in closing the skin at the end of the procedure.

b. Surgeon makes incision in segments while assistance applies digital pressure over a folded 4 × 4 sponge at either end of the incision line.

c. Surgeon places hemostats or scalp clips for hemostasis along the outside edge of the incision.

d. Surgeon separates soft tissues from periosteum by sharp or blunt dissection or by electrodissection.

e. The scalp flap is turned back and covered with a moist sponge and a sterile towel.

f. Surgeon incises periosteum and muscle with a scalpel or cautery knife except at inferior margins to preserve blood supply.

g. Surgeon strips periosteum from bone with a periosteal elevator.

h. Surgeon makes two or more bur holes with either a hand or power drill.

Note: Technologist must be ready to irrigate the drilling site to counteract heat build up and to remove bone dust.

i. Surgeon uses a rongeur, such as a Kerrison, to enlarge the bur holes.

Note: Bone wax may be used to control bleeding.

j. Surgeon separates the dura mater from the bone by a dural separator, No. 3 Penfield dissector, or similar instrument.

k. Surgeon saws the skull between bur holes with a gigli saw or craniotome.

l. Surgeon lifts the skull flap off the dura mater with two periosteal elevators and controls bleeding with bone wax.

m. Bone flap is covered with a moist sponge and a sterile towel and is retracted in the same manner as the scalp flap.

Note: If the bone flap (plate) is completely freed, it will be removed and protected in saline-moistened sponges in a basin.

Information Sheet

n. Surgeon irrigates the dura, covers exposed bone edges with moist cottonoid material, and places clean towels around operative site.

o. Surgeon uses dura hook to elevate dura mater from brain, and makes a small nick in the dura with a No. 15 blade.

p. Surgeon grasps dura edges with toothed Adson or Cushing forceps and extends the incision with Metzenbaum or dura scissors.

Note: At this point the technologist needs to prepare traction sutures on fine needles.

q. Surgeon retracts and tacks dura away from the wound.

r. Surgeon protects brain surface with moist cottonoid strips.

s. Surgeon performs procedure indicated by pathological condition.

Note: The technologist should have filled, irrigating syringes, a full range of moist cottonoid patties, and other hemostatic agents ready and accessible at all times.

t. Surgeon may irrigate wound with antibiotic solution following removal of the lesion.

u. Surgeon closes dura with fine nonabsorbable suture.

Note: Dura may be closed or left open depending on surgeon's preference.

v. If bone flap is to be replaced, surgeon uses power drill to make small holes in the edges of the cranium and the bone flap.

w. Surgeon passes short lengths of wire through holes to reattach flap to skull. The wire twister is used to snug down wires against the bone.

x. Surgeon sutures loose periosteum and galea over bur holes and bone flap.

y. Surgeon removes scalp clips and sutures muscle, subcutaneous tissue, and skin with sutures of choice.

Information Sheet

11. Spinal neurosurgical procedures

a. **Laminectomy** — Removal of one or more vertebral laminae to expose the spinal cord; commonly performed to treat one of the following:

   (1) Herniated disc (nucleus pulposus)

   (2) Spinal cord tumor

   (3) Meningocele

   (4) Compression fracture or dislocation

   (5) Spinal cord injuries due to trauma

b. **Removal of anterior cervical disc with fusion** — Excision of one or more herniated cervical intervertebral discs and the placement of bone grafts between the vertebrae to fuse them together

c. **Cervical cordotomy (rhizotomy)** — Division of the spinothalamic tract to treat intractable pain

12. Procedure for an anterior cervical laminectomy and fusion

a. Patient is placed in supine position with head turned slightly to the left and the right hip elevated on a sandbag or rolled towel.

b. Both operative sites, the neck and the right iliac crest, are prepped and draped.

   Note: The exposed iliac crest can be covered with a sterile towel following draping until the surgeon is ready to take the bone graft.

c. Surgeon makes a transverse incision over the involved disc space.

d. Surgeon deepens the wound with the deep knife, Metzenbaum scissors, or electrosurgical pencil, severing the platysma muscle.

e. Surgeon places a small self-retaining retractor in the wound.

f. Surgeon identifies the carotid artery and incises the muscle fibers lying medially to expose the vertebrae.

g. Surgeon incises the fascia lying over the vertebrae and exposes it using a small retractor such as an Army-Navy.

h. Surgeon incises and removes the anterior longitudinal ligament.

Information Sheet

i. Surgeon inserts a short hypodermic needle into the disc space, and a lateral x-ray is taken to determine the disc level to ensure it is the diseased disc.

j. The neck incision is covered with a sterile towel, and surgeon moves to bone graft site.

k. Surgeon makes incision over iliac crest and dissects through soft tissue to expose the crest, cauterizing and retracting as needed.

l. Surgeon removes bone graft using a Hudson brace with the Cloward dowel cutter or an osteotome and mallet.

Note: The dowel cutter, guide, and cervical drill guides must be matched for size.

m. Surgeon applies bone wax as needed, packs incision with sponges, and covers with a sterile towel.

n. Surgeon places a Cloward self-retaining retractor in the wound.

o. Surgeon uses a number 15 or 11 blade to cut into the disc space.

p. Surgeon removes disc material with a pituitary rongeur and fine curettes.

q. Technologist retrieves bits of disc specimen from the rongeur or curette using a wet 4 × 4.

r. Surgeon inserts Cloward bone guide into the disc space to measure its depth.

s. Surgeon adjusts the drill guard as measured by guide to prevent protrusion to depths of interspace, and then inserts it about the disc space with mallet until points catch the vertebral bodies above and below the interspace.

t. After placement of guard, the self-retaining retractor is removed or spread limitedly.

u. A Cloward drill on Hudson brace is inserted into the guard and the hole drilled. Bone specimen on drill is saved. Bleeding is controlled with cotton strips, gelatin sponges (Gelfoam®), or thrombin-soaked cotton pledgets.

Caution: Bone wax should not be used on walls of disc hole.

v. The disc hole is checked for removal of all specimen, drilling is done until desired depth is reached, and the guide and drill are then removed.

Information Sheet

w. A Cloward cervical punch or curettes are used to remove more bone until complete anterior decompression of the nerve roots or dural sac is obtained.

x. The disc hole depth is measured and compared to the dowel; the dowel can be trimmed with a drill, rongeur, or rasp as needed; and the shaped dowel is inserted into the hole and tapped into place with an impactor; then the retractor is removed.

y. Hemostasis is obtained, wound is irrigated, and incisions are closed.

13. Surgical procedures involving peripheral nerves

a. **Peripheral nerve repair (Neurorrhaphy)** — Restoration of continuity of a nerve for regeneration of axon fibers following a peripheral nerve injury

b. **Carpal tunnel release** — Decompression of the median nerve by removing part of the roof of the fibrous sheath of the transverse carpal ligament, or removal of the lunate bone or volar carpal ganglion

c. **Ulnar nerve transposition** — Involves surgically changing the position of the ulnar nerve which has caused pain and discomfort because of traumatic or anatomical problems

d. **Lumbar sympathectomy** — Excision of a segment of the lumbar sympathetic chain to treat vasospastic disorders and selected cases of peripheral vascular insufficiency; results in increased circulation to the lower extremities

Note: This is commonly performed by a cardiovascular surgeon. It may be performed on one or both sides.

14. Specialized instruments used in neurosurgery

Note: Many other specialized instruments could be added to this list. Complete setup will also include basic general instruments, and possibly, microsurgical instruments depending on the procedure.

a. Cranial drill sets (Hudson, Stille) including brace and various twist drills, burs (perforating and enlarging), and trephines

b. Large retractors

(1) Mastoid retractor (Jansen)

(2) Scalp retractor (Jansen, Davis)

(3) Spinal retractor (Taylor)

(4) Cerebellar retractor (Adson)

(5) Laminectomy retractor (Frazier, Tuffier, Meyerding, Beckman-Adson)

Information Sheet

c. Small retractors
  - (1) Vein (and nerve) retractors (Cushing, Sachs)
  - (2) Decompression retractors (Cushing)
  - (3) Nerve separator-spatulas (Sachs, Davis)
  - (4) Nerve root retractors (Love, Scoville)
  - (5) Periosteal elevators (Cushing "Little Joker", Freer, Adson)
  - (6) Penfield dissectors
  - (7) Hooks—Dura hooks (Cushing, Frazier, Adson) and nerve hooks (Dandy, Smithwick)
  - (8) Brain spatula (Scoville, Cushing)

d. Rongeurs
  - (1) Standard rongeur (Beyer, Ruskin, Stille-Luer)
  - (2) Cranial rongeur (Adson, DeVilbiss)
  - (3) Laminectomy rongeur (Leksell, Smith-Petersen, Fulton, Hajek-Kofler)
  - (4) Duckbill rongeur (Echlin, Stille-Luer)
  - (5) Cervical rongeur (Schlesinger, Spurling-Kerrison, Love-Kerrison)
  - (6) Pituitary rongeur (Cushing, Love-Gruenwald, Spurling, Cloward, Schlesinger)

e. Saws, saw handles, and saw guides (Gigli, Gigli-Strully)

f. Scissors
  - (1) Dural scissors (Taylor)
  - (2) Ganglion scissors (Adson)
  - (3) Neurological scissors (Strully)

Information Sheet

g. Spoons and curettes

  (1) Pituitary spoons (Cushing)

  (2) Ruptured disc curettes (Scoville)

  (3) Spinal fusion curettes (Hibbs, Spratt)

  (4) Bone curettes (Spratt, Brun)

h. Clip applying forceps (Smithwick, McKenzie, Scoville, Raney)

i. Suction tubes (Adson, Frazier, Baron)

Neurosurgery
Unit 11

Student Supplement 1—Review Anatomy of the Head

Name ______________________ Date ______________

Directions: Identify the following structures of the head, and place your answers in the blanks provided.

a. ______________

b. ______________

c. ______________

d. ______________

e. ______________

f. ______________

g. ______________

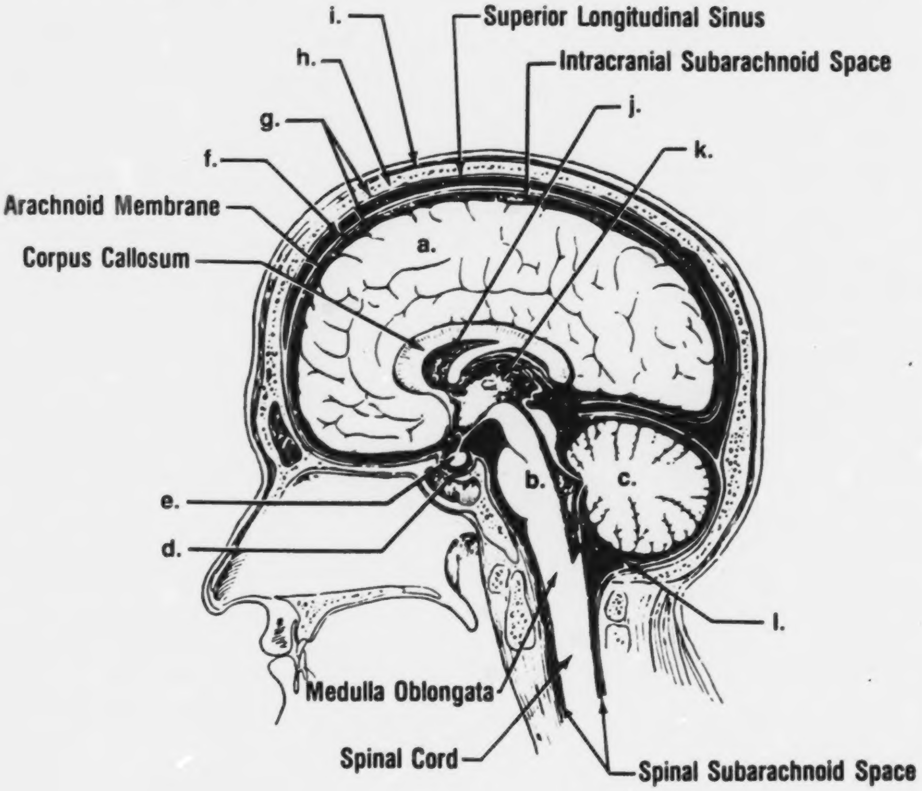
h. ______________

i. ______________

j. ______________ Ventricle

k. ______________ Ventricle

l. ______________ Ventricle



i.
Superior Longitudinal Sinus
h.
Intracranial Subarachnoid Space
j.
g.
k.
f.
Arachnoid Membrane
a.
Corpus Callosum
b.
c.
e.
d.
l.
Medulla Oblongata
Spinal Cord
Spinal Subarachnoid Space

Neurosurgery
Unit 11

Student Supplement 2—Review Anatomy of the Spine

Name ______________________________ Date __________________

Directions: Identify the following structures of the spine, and place your answers in the blanks provided.

a. ____________________

b. ____________________

c. ____________________

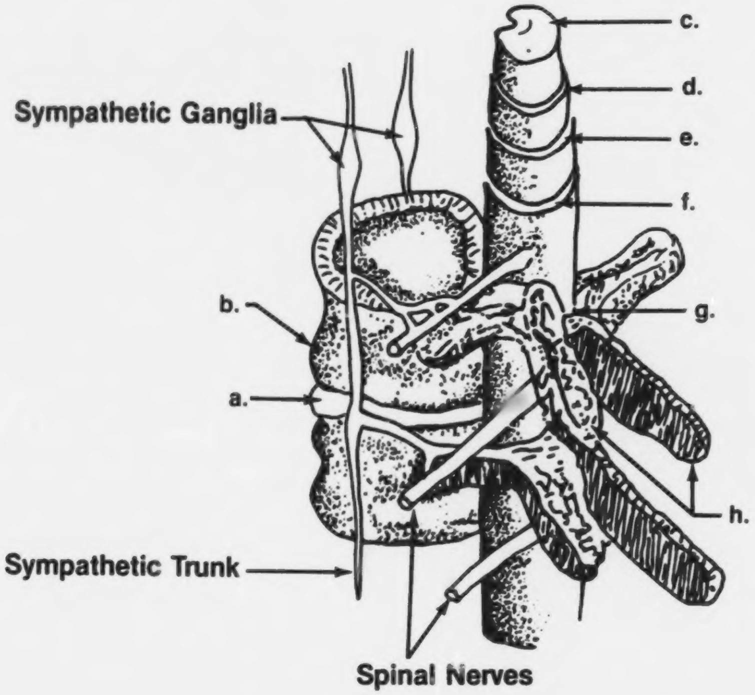
d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________


c.
d.
Sympathetic Ganglia
e.
f.
g.
b.
a.
h.
Sympathetic Trunk
Spinal Nerves

Neurosurgery
Unit 11

Assignment Sheet 1—Determine Needs for Given Neurosurgical Cases

Name ______________________ Overall Rating __________

Evaluation criteria	**Rating**
Answers are appropriate	______
Descriptions are complete sentences using correct grammar, spelling, and punctuation	______

Directions: Read each of the following cases, and fill in the blanks with the appropriate information. Refer to the information sheets as needed.

Case A: A 42-year-old female is scheduled for craniotomy of the temporal cerebral lobe.

1. Name two possible diagnostic tests that the patient may have had.

   a. ______________________________

   b. ______________________________

2. List at least two conditions that might necessitate a craniotomy.

   a. ______________________________

   b. ______________________________

3. What position will be used for this procedure? ______________________

4. If a skull clamp is requested, name one type that could be used. ______________

5. List two mechanical and two chemical methods of hemostasis.

   a. Mechanical

      (1) ______________________________

      (2) ______________________________

   b. Chemical

      (1) ______________________________

      (2) ______________________________

Assignment Sheet 1

6. Draw a usable Mayo and/or Mayfield for this procedure. Instruments may be drawn or their names written in.

Case A Mayo/Mayfield

Case B: A 17-year-old male involved in a motorcycle accident is scheduled for an anterior cervical laminectomy with fusion at C5-C6.

1. Name two diagnostic tests that may have been performed.

a. ______________________________

b. ______________________________

2. What two operative sites will be prepped and draped?

a. ______________________________

b. ______________________________

Assignment Sheet 1

3. List two instruments that could be used to take the bone graft.

   a. ______________________________

   b. ______________________________

4. List two instruments that could be used to remove the disc material.

   a. ______________________________

   b. ______________________________

5. Describe how bleeding in the disc area will be controlled.

   ____

   ____

6. Draw a usable Mayo and/or Mayfield for this procedure. Instruments may be drawn or their names written in.

   Case B Mayo/Mayfield

Thoracic Surgery
Unit 12

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match thoracic surgical and endoscopic procedures with the correct descriptions, determine needs for given thoracic surgery cases, and connect chest tube to drainage system. The student should demonstrate these competencies by completing the assignment and job sheets and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to thoracic surgery with their correct definitions.
2. State purposes of thoracic surgery.
3. Complete statements concerning special considerations of thoracic surgery.
4. List types of thoracic procedures.
5. Distinguish among positions used for thoracic procedures.
6. List purposes of thoracic endoscopic procedures.
7. Match endoscopic procedures commonly used in thoracic surgery with the correct descriptions.
8. Distinguish among incisional approaches to the thoracic cavity.
9. Match operations on the lung with the correct descriptions.
10. Complete statements concerning procedures in the mediastinum.
11. Match specialized instruments for thoracic surgery with the correct uses.
12. Select true statements concerning underwater chest drainage systems.
13. Complete statements concerning the procedure for an open thoracotomy.
14. Determine needs for given thoracic surgery cases. (Assignment Sheet 1)
15. Connect chest tube to disposable chest drainage system. (Job Sheet 1)

Thoracic Surgery
Unit 12

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Pleura (Objective 1)
   TM 2—Segmental Anatomy of the Lungs (Objective 1)
   TM 3—Thoracic Cavity (Objective 1)
   TM 4—Bottle Chest Drainage Systems (Objective 12)
   TM 5—Disposable Chest Drainage Systems (Objective 12)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Review "Instructions for Evaluating Student Performance," which follows the resources in this section of the unit. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

Suggested Activities

11. Discuss the student supplements. These could be used as a homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

13. Discuss and demonstrate the job sheet. Make sure all required tools, equipment, and supplies are available. Review criteria for evaluation of this activity.

Evaluation

14. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

15. Make copies of the written test. Add or modify test items as needed.

16. Give written test.

17. Compile assignment sheet ratings, job sheet ratings, and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

18. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Obtain x-rays from a local surgeon for the students to view types of lung lesions, resections, chest tube placement, and foreign bodies. The students may also use these for their group assignments.

2. Review anatomy, physiology, and pathology as they relate to thoracic surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

3. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

Suggested Activities

4. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in thoracic surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

5. Make a display of the basic and specialized instruments that are required in thoracic surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

6. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in thoracic surgery. Have the speaker cover the following for each basic procedure:

    a. Diagnosis that brings the patient to surgery
    b. Preoperative work ups
    c. Highlights of the surgical procedure (including instruments and anatomical structures)
    d. Postoperative course

    Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

7. Have assigned students give oral reports on their research about thoracic surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in thoracic surgery. **Foundation skills, communication skills, personal management skills, influence skills**

    Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

8. Divide students into groups, and assign each group a different procedure commonly performed in thoracic surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic set ups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

Suggested Activities

9. Show videos of procedures common to thoracic surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

10. Provide clinical orientation and guided clinical practice of thoracic surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology*. Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Supplemental Resources

1. *Chest Drainage*, 1991. 30-minute videotape that demonstrates how to assist with chest tube insertion and removal. Also covers disposable chest-drainage system. Available from:

   Insight Media
   121 West 85th Street
   New York, NY 10024
   212-721-6361

Suggested Activities

2. *Understanding Chest Tube Drainage Systems*, 28-minute videotape that explains indications for the use of chest tubes, demonstrations of the operation of 1, 2, and 3 bottle systems, disposable systems such as Pleurevac and the Emerson pump. Available from:

   American Journal of Nursing Company
   Educational Services Division
   555 West 57th Street
   New York, NY 10019-2961
   800-CALL AJN

3. *Pulmonary Resection: Right Upper Lobectomy*, SS5001, 1988. 20-minute videotape that demonstrates right-upper lobectomy for carcinoma of the lung.

4. *Thoracoscopic Management of Recurrent Spontaneous Pneumothorax*, ACS-1651, 1990. 10-minute videotape that shows the suture ligature of pleural blebs and electrocautery via a modified thoracoscopic technique.

5. *Technique of Thoracoscopic Lung Biopsy*, ACS-1725, 1992. 10-minute videotape that shows this technique for obtaining lung tissue.

6. *Segmental Resection of Lung for Cancer*, ACS-1398, 1986. 7-minute videotape that emphasizes the importance of segmental lymph nodes and biopsying lobar and mediastinal nodes.

7. *Pulmonary Resection Via Median Sternotomy, Cine Clinic*, DG-1483, 1984. 22-minute videotape that illustrates case presentations and advantages and disadvantages of this approach.

8. *The Repair of Pectus Excavatum*, ACS-1743, 1991. 15-minute videotape that shows this repair procedure.

   3 - 8 (and many others) are available from:

   ACS/Davis + Geck Video Library
   Cine-Med, Inc.
   127 Main Street North
   P.O. Box 745
   Woodbury, CT 06798
   800-633-0004 or 203-263-0080

Suggested Activities

Instructions for Evaluating Student Performance

When the student is ready to perform a specific task, obtain a copy of the job sheet which may be found in either the teacher or student edition. Then observe the student performing the procedure.

Process evaluation—Place a mark in the box to the left of each designated checkpoint if the student has satisfactorily achieved the step(s) for each checkpoint area. If the student is unable to correctly complete the procedure, have the student review the materials and try again.

Product evaluation—Once the student has satisfactorily completed the procedure, rate the student product (outcome) using the criteria which have been provided as part of the job sheet. If the student's product is unacceptable, have the student review the materials and submit another product for evaluation.

Sample performance evaluation keys have been provided below. Many other keys are available. Select one rating (grading scale) which best fits your program needs.

Option A

4 - Skilled—Can perform job with no additional training.
3 - Moderately skilled—Has performed job during training program; limited additional training may be required.
2 - Limited skill—Has performed job during training program; additional training is required to develop skill.
1 - Unskilled—Is familiar with process, but is unable to perform job.

Option B

Yes—Can perform job with no additional training.

No—Is unable to perform job satisfactorily.

Thoracic Surgery
Unit 12

Answers to Student Supplements

Student Supplement 1

a. Right lower lobe
b. Right middle lobe
c. Right upper lobe
d. Left upper lobe
e. Left lower lobe

Student Supplement 2

a. Intercostal muscle
b. Ribs
c. Right lung
d. Right bronchus
e. Trachea
f. Left bronchus
g. Left lung
h. Pleura (and pleural space)

Thoracic Surgery
Unit 12

Answers to Assignment Sheet 1

Note: Procedures for each given case will vary. Instructor should evaluate answers dependent upon regional differences and surgeons' preferences and amount of specific instructional information given.

Case A:

1. Bronchoscopy
2. General
3. Modified supine
4. Any four of the following:

    a. Basic pack with split sheet
    b. Gloves
    c. Gowns
    d. Rigid bronchoscope and accessory equipment
    e. Endotracheal adapter
    f. Fiberoptic light source/cord
    g. Small basic with saline
    h. Suction tubing
    i. Lubricant

5. Any two of the following:

    a. Plastic mouth piece to protect lips and teeth
    b. All chest x-rays available in the room
    c. Small rolls, sandbags, and do-nut ring needed
    d. Due to patient's age, keep environment quiet, use simple explanations, and maintain warm environment.

Case B:

1. Mediastinoscopy
2. General
3. Modified supine
4. Any four of the following:

    a. Laparotomy pack
    b. Extra towels
    c. Gowns
    d. Gloves
    e. Mediastinoscope and accessory equipment
    f. Mediastinoscopy tray

Answers to Assignment Sheet 1

- g. Fiberoptic light source/cord
- h. Basin set with saline
- i. Suction tubing
- j. Blades #10 and #15
- k. Telfa and needle for specimen removal

5. Any two of the following:

    - a. Sterile technique must be maintained.
    - b. Sponge counts are required.
    - c. All preoperative diagnostic workup must be in the room.
    - d. Small rolls, sandbags, and do-nut ring are needed.

Case C:

1. General
2. Lateral with affected side up
3. Posterolateral thoracotomy incision

    Note: Instructor may change required instruments and supplies or specify additional instruments and supplies.

4. Laparotomy tray, chest tray, vascular tray (depending on contents of previous trays), internal stapling devices, hemoclips/surgiclips
5. Any seven of the following:

    - a. Laparotomy pack
    - b. Extra towels
    - c. Gowns
    - d. Gloves
    - e. Basin set
    - f. Suction
    - g. Cautery
    - h. Needle counter
    - i. Blades
    - j. Dissecting sponges
    - k. Radiopaque 4×4's
    - l. Laparotomy sponges
    - m. Bulb (Asepto) syringe
    - n. Vessel loops
    - o. Bone wax
    - p. Normal saline
    - q. Sterile water
    - r. Chest tubes
    - s. Chest drainage unit and Y connector

Answers to Student Supplement 1

6. Keep isolated from the sterile field. They are contaminated.
7. Any two of the following:

    a. Preoperative diagnostic workup must be in the room.
    b. Extra pillows, blankets, and sandbags are needed for positioning patient.
    c. Hypothermia blanket may be needed.
    d. Set up water-seal drainage system according to manufacturer's directions.
    e. Have blood available as ordered.
    f. Accurate record of irrigating fluids should be kept.
    g. Radiology should be notified for chest films post-operatively.

Thoracic Surgery
Unit 12

Answers to Written Test

1.	a.	16	e.	6	i.	19	m.	11
	b.	1	f.	17	j.	2	n.	15
	c.	9	g.	7	k.	14	o.	5
	d.	10	h.	13	l.	4	p.	18

2. Any two of the following:

    a. To diagnose a pathological process by means of endoscopy and/or open biopsy
    b. To treat diseased tissue by resection or repair
    c. To correct a structural deformity

3. a. Staples
    b. Long, ring-handled forceps
    c. Any two of the following:

        (1) Absorbable gelatin sponges
        (2) Cautery
        (3) Bone wax
        (4) Topical agents (several types)
        (5) Others as appropriate

    d. Before
    e. Any one of the following:

        (1) X-rays
        (2) CT scans
        (3) MRI scans
        (4) Others as appropriate

    f. General
    g. Contaminated
    h. Aspiration of blood and/or fluids (leading to pneumonia)

4. Any two of the following:

    a. Endoscopic procedures
    b. Operations involving the lung, pleurae, and/or chest wall
    c. Operations involving the mediastinum

5. a. S
    b. L
    c. MS

Answers to Written Test

6. Any two of the following:
   - a. To diagnose pathological processes and/or their exact location by obtaining tissue biopsies and/or secretion specimens
   - b. To observe periodically the effects of therapy
   - c. To remove food or foreign body obstructions

7. a. 4
   b. 6
   c. 1
   d. 2

8. a. T
   b. P
   c. A
   d. M
   e. T
   f. M
   g. P
   h. A
   i. P

9. a. 10
   b. 4
   c. 7
   d. 12
   e. 3
   f. 5
   g. 1
   h. 2
   i. 6

10. a. Esophagectomy
    b. Obese
    c. Sternum
    d. Thymus

11. a. 2
    b. 8
    c. 1
    d. 4
    e. 3
    f. 6

12. a. T
    b. F
    c. T
    d. T
    e. F
    f. F
    g. F
    h. F
    i. F
    j. T

Answers to Written Test

13. a. Intercostal
    b. Rib
    c. Rib shears
    d. Bone wax
    e. Ribs
    f. Pleura
    g. Pleural
    h. Clamped
    i. Reapproximate ribs
    j. Closed drainage system

Thoracic Surgery
Unit 12

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

_____a. Smaller subdivisions of the lobes of the lung, separated from others by connective tissue and supplied by separate branches of the bronchus leading to the particular lobe

_____b. Secretions obtained from the bronchi for laboratory examination following injection and aspiration of small amounts of saline

_____c. Congenital malformation of the chest wall characterized by a funnel-shaped depression of the lower end of the sternum and costal cartilages

_____d. Serous membrane enclosing the lungs and lining the walls of the thoracic cavity

_____e. Space between two ribs

_____f. Soft indentation along the midline immediately above the sternum

_____g. Well-defined portions; the right lung has three, the left lung, two

_____h. Accumulation of air or gas in the pleural cavity, resulting in the collapse of the lung on the affected side

_____i. Space lying above the diaphragm and below the base of the neck

1. Bronchial washings
2. Empyema
3. Flail chest
4. Hemothorax
5. Hypoxia
6. Intercostal space
7. Lobes
8. Pectus carinatum
9. Pectus excavatum
10. Pleura
11. Pleural effusion
12. Pleural space
13. Pneumothorax

Written Test

______j. Pus in a body cavity, especially in the pleural cavity

______k. Maximum volume of air that can be expired from the resting expiratory level

______l. Accumulation of blood or fluid in the pleural cavity caused by rupture of small blood vessels due to trauma or inflammation of the lungs in pneumonia, pulmonary tuberculosis, or a malignant growth

______m. Abnormal accumulation of fluid in the pleural space

______n. Amount of air remaining in the lungs at the end of a maximum expiration

______o. Lack of an adequate amount of oxygen in inspired air; reduced oxygen content or tension

______p. Amount of air inhaled and exhaled during normal quiet breathing

14. Reserve air
15. Residual air
16. Segments of the lung
17. Suprasternal notch
18. Tidal air
19. Thoracic cavity
20. Vital capacity

2. State two purposes of thoracic surgery.

    a. ______________________________

    b. ______________________________

3. Complete the following statements concerning special considerations of thoracic surgery by filling in the blanks with the correct answers.

    a. ______________ are commonly used to close the bronchus.

    b. Sponges for blunt dissection and hemostasis are placed on ______________.

Written Test

c. Name two hemostatic aids that must be ready at all times.

(1) ______________________________

(2) ______________________________

d. Antiemboletic stockings or sequential pneumatic compression devices should be placed on the patient ______________ surgery.

e. Name one preoperative diagnostic work-up that should be in the operating room during the procedure. ______________

f. ______________ anesthesia is given for most open thoracic procedures.

g. Items that come in contact with an open bronchus are considered ______________.

h. Maintenance of a dry surgical field is imperative to prevent ______________

______________________________.

4. List two types of thoracic procedures.

a. ______________________________

b. ______________________________

5. Distinguish among positions used for thoracic procedures by placing the following letters next to the correct descriptions:

L — Lateral position
S — Supine position
MS — Modified supine position

______a. Used for median sternotomy incision

______b. Used for full posterolateral thoracotomy incision

______c. Used for anterolateral thoracotomy incision and most thoracic endoscopic procedures

Written Test

6. List two purposes of thoracic endoscopic procedures.

   a. ____

   b. ____

7. Match endoscopic procedures commonly used in thoracic surgery on the right with the correct descriptions.

   ______a. Direct visualization of the mediastinal space and lymph nodes by means of a lighted scope

   ______b. Direct visualization of the pleural space, pleurae, mediastinum, pericardium, and thoracic wall by means of a lighted scope

   ______c. Direct visualization of the tracheobronchial tree following insertion of a rigid or flexible lighted scope

   ______d. Direct visualization of the esophagus and cardiac portion of the stomach by means of a lighted scope

   1. Bronchoscopy
   2. Esophagoscopy
   3. Laryngoscopy
   4. Mediastinoscopy
   5. Pleuroscopy
   6. Thoracoscopy

8. Distinguish among incisional approaches to the thoracic cavity by placing the following letters next to the correct descriptions:

   A — Anterolateral thoracotomy incision
   M — Median sternotomy incision
   P — Posterolateral thoracotomy incision
   T — Thoracoabdominal incision

   ______a. Used for surgery involving the upper abdomen, retroperitoneal area, and lower thoracic cavity

   ______b. Most often used thoracic incision

   ______c. Inframammary incision is made from anterior midline or sternal border to midaxillary line.

   ______d. Used for surgery in the mediastinum such as a thymectomy

Written Test

______e. Incision extends from axilla to abdominal midline running parallel to the selected intercostal space

______f. Incision is made over the length of the sternum from the gladiolus to the xiphoid process.

______g. Incision is made over the rib or intercostal space selected by the surgeon.

______h. Used for less complex procedures such as lung biopsy

______i. Used for complex procedures such as a lobectomy or pneumonectomy

9. Match operations on the lung on the right with the correct descriptions.

______a. Incision into the thoracic cavity to provide access to organs of the chest

______b. Excision of a small portion of lung tissue for diagnosis

______c. Removal of an individual bronchovascular segment of a pulmonary lobe with ligation of segmental branches of pulmonary vessels and division of the segmental bronchus

______d. Excision of a small part from the periphery of a pulmonary lobe

______e. Removal of one or more diseased lobes of the lung

______f. Removal of an entire lung, commonly performed to treat carcinoma of the lung

______g. Insertion of a catheter through a very small incision in an intercostal space to establish a closed drainage system

______h. Excision of fibrinous deposits or restrictive membranes of pleurae that interfere with respiratory function

______i. Removal of a segment of a rib or the entire rib

1. Closed thoracostomy
2. Decortication of the lung
3. Lobectomy
4. Lung biopsy
5. Pneumonectomy
6. Rib resection
7. Segmental resection of the lung
8. Thoracic outlet syndrome
9. Thoracoplasty
10. Thoracotomy
11. Transplantation
12. Wedge resection of the lung

Written Test

10. Complete the following statements concerning procedures on the mediastinum by circling the correct answers.

    a. (Esophagectomy, Esophagoplasty) is the resection of the upper, middle, or lower third of the esophagus with anastomosis of the stomach, small intestine, or large intestine.

    b. A hiatal hernia may be repaired using a thoracic approach if the patient is (very thin, obese).

    c. The repair of pectus excavatum/carinatum is the correction of deformities of the (scapula, sternum) and/or costal cartilages of the anterior chest wall.

    d. Thymectomy is the excision of the (thyroid, thymus) gland, with or without en bloc resection.

11. Match the specialized instruments for thoracic surgery on the right with the correct descriptions.

______a. Grasping/holding instruments used to grasp the various tissues of the thoracic cavity

______b. Cutting instrument used to transect the sternum

______c. Closing instruments used to bring ribs and sternum back into proper alignment after retraction

______d. Cutting instruments used to smooth bone surfaces

______e. Cutting/dissecting instruments used to free, cut, and strip the periosteum from the bone

______f. Cutting instruments used to remove a rib or rib segments

1. Contractors/approximators
2. Forceps, specialized
3. Periosteal elevator/stripper and periosteotome
4. Raspatories
5. Retractors/spreaders
6. Rib shears
7. Sternal chisel/knife
8. Sternal saw

Written Test

12. Select true statements concerning underwater chest drainage systems by placing a "T" next to the true statements and an "F" next to the false statements.

    ______a. System consists of one or more chest tubes connected to a closed drainage unit or bottles.

    ______b. System is used to instill antibiotics into the thoracic cavity.

    ______c. Drainage is indicated for pneumothorax, hemothorax, trauma to chest, pleura abscesses, or empyema.

    ______d. Chest tubes are sterile tubes with multiple openings in the end available in a variety of sizes from 16-36 French.

    ______e. One-bottle drainage systems are traditionally and most commonly used.

    ______f. Disposable units are rarely used because they are heavy and difficult to use.

    ______g. In the three-bottle system the first bottle collects drainage, the second bottle provides water seal, and the third bottle is a backup for the first bottle.

    ______h. In the two-bottle system the first bottle provides suction control, and the second bottle collects drainage and provides water seal.

    ______i. When in use, the bottles or closed unit must be kept above body level to maintain correct amount of suction.

    ______j. Clamps for the tubing should always be available as a precautionary measure.

13. Complete the following statements concerning the procedure for an open thoracotomy by filling in the blanks with the correct answers.

    a. Surgeon incises over selected __________________ space through skin, subcutaneous tissue, and muscle layers, and cauterizes or clamps and ligates bleeding vessels.

    b. Periosteum is incised by the surgeon and freed from the __________________ with a periosteal elevator, raspatory, and/or scissors.

    c. Surgeon removes the rib or rib segment with __________________.

Written Test

d. Surgeon trims bone edges with a rongeur or Sauerbruch rib shears and applies __________________ for hemostasis.

e. Technologist hands surgeon moist lap sponges to cover and protect wound from retractor edges and passes to surgeon the retractor of choice which is then inserted between __________________ and opened slowly.

f. Surgeon incises __________________, frees adhesions, and explores chest, suctioning as necessary, in order to locate pathology.

g. Surgeon performs procedure of choice; following procedure, surgeon inserts one or two chest tubes into the __________________ space and brings them through a stab wound near the anterior axillary line.

h. Chest tubes are __________________ until connected to a water-seal drainage system.

i. Surgeon places heavy pericostal sutures around the two ribs and holds the ends of each suture with a hemostat, uses a Bailey rib contractor to ____________ ____________, and ties pericostal sutures and cuts ends.

j. Surgeon reapproximates periosteum with a running absorbable suture, closes layers with suture of choice, and anchors drains to chest wall and connects to __________________. Technologist applies dressings according to surgeon's preference.

759

***Permission to duplicate this test is granted.**

Thoracic Surgery
Unit 12

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given Thoracic Surgery Cases Rating ______

Comments: ____

____

Job Sheet 1—Connect Chest Tube to Disposable Chest Drainage System Rating ______

Comments: ____

____

Written Test Scores

Pretest ______ Posttest ______ Other ______

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

***Permission to duplicate this form is granted.**

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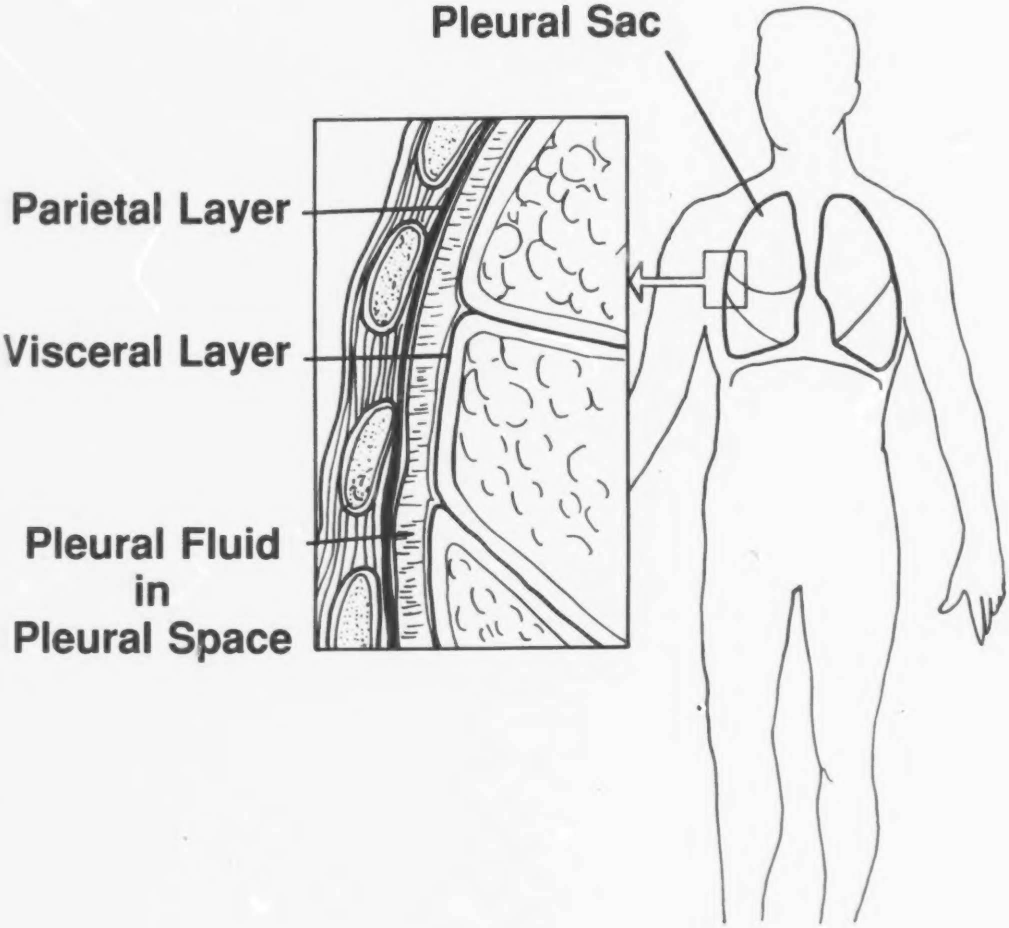
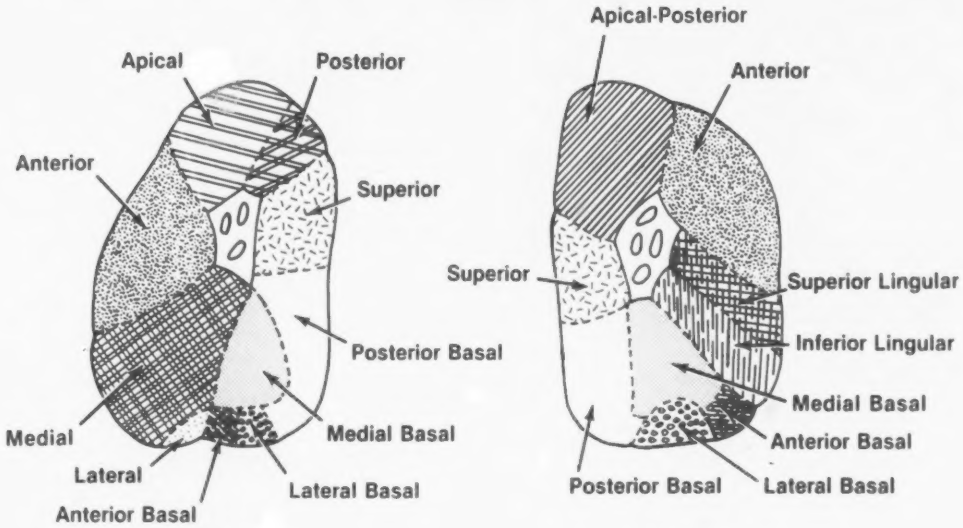
Pleura


Pleural Sac
Parietal Layer
Visceral Layer
Pleural Fluid in Pleural Space

761

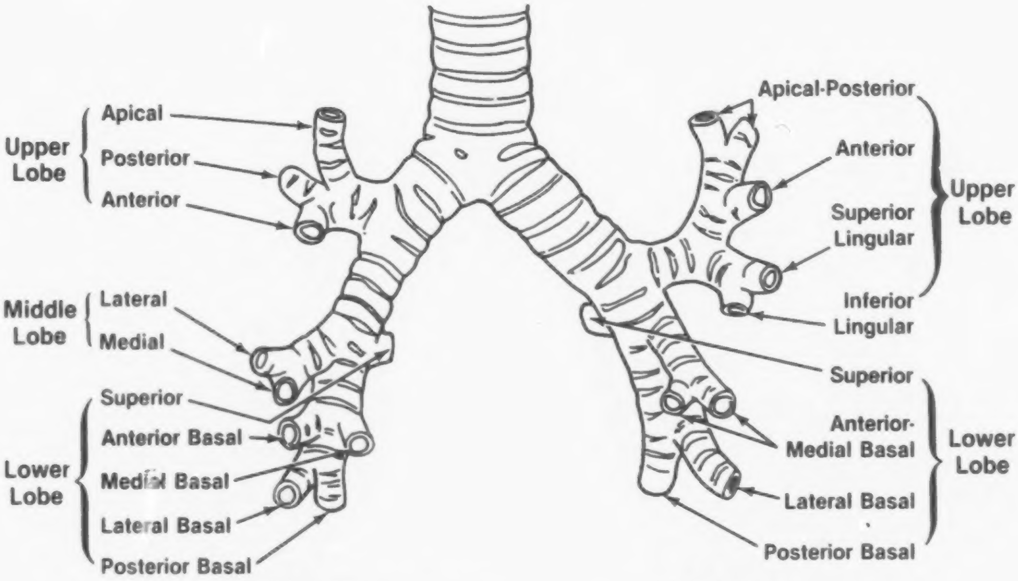
Segmental Anatomy of the Lungs


Apical
Posterior
Anterior
Superior
Posterior Basal
Medial Basal
Medial
Lateral
Anterior Basal
Lateral Basal
Apical-Posterior
Anterior
Superior
Superior Lingular
Inferior Lingular
Medial Basal
Anterior Basal
Posterior Basal
Lateral Basal

Right Lung
(Medial View)

Left Lung
(Medial View)

Bronchopulmonary Segments


Upper Lobe
Apical
Posterior
Anterior
Middle Lobe
Lateral
Medial
Lower Lobe
Superior
Anterior Basal
Medial Basal
Lateral Basal
Posterior Basal
Apical-Posterior
Anterior
Superior Lingular
Upper Lobe
Inferior Lingular
Superior
Anterior-Medial Basal
Lateral Basal
Lower Lobe
Posterior Basal

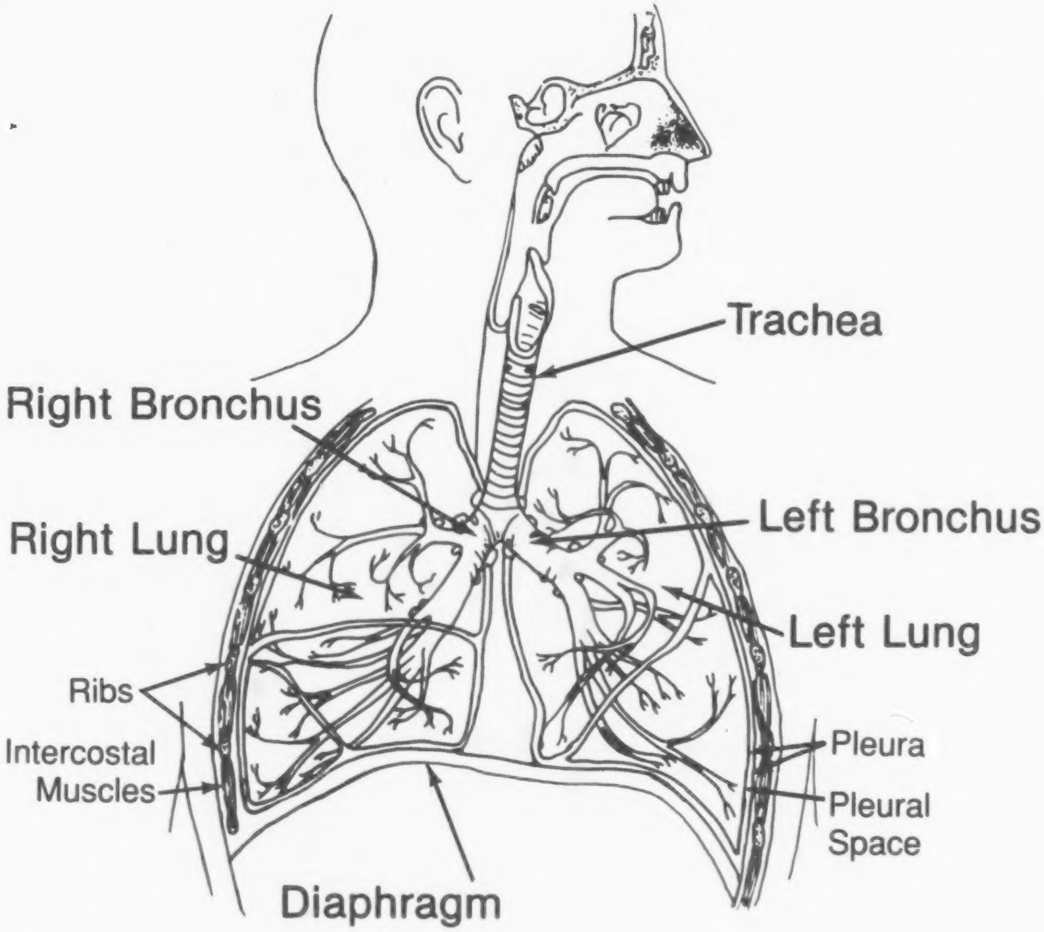
Right Lung

762

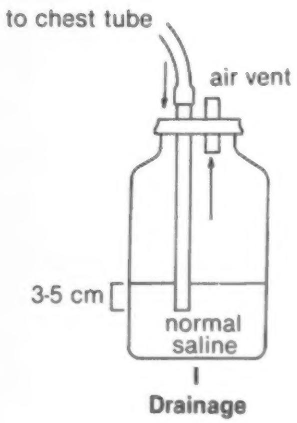
Left Lung

Segmental Bronchi

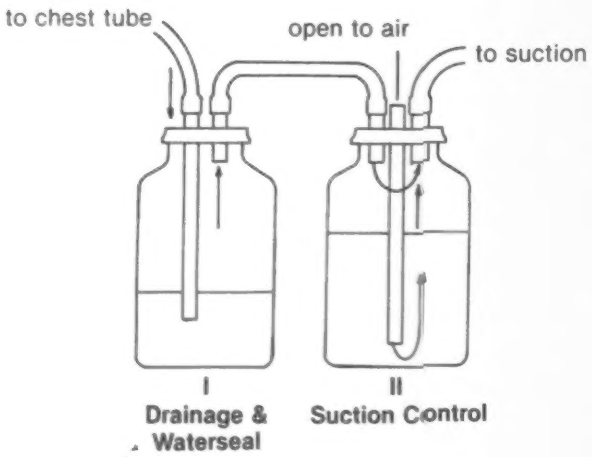
Thoracic Cavity


Trachea
Right Bronchus
Left Bronchus
Right Lung
Left Lung
Ribs
Intercostal Muscles
Pleura
Pleural Space
Diaphragm

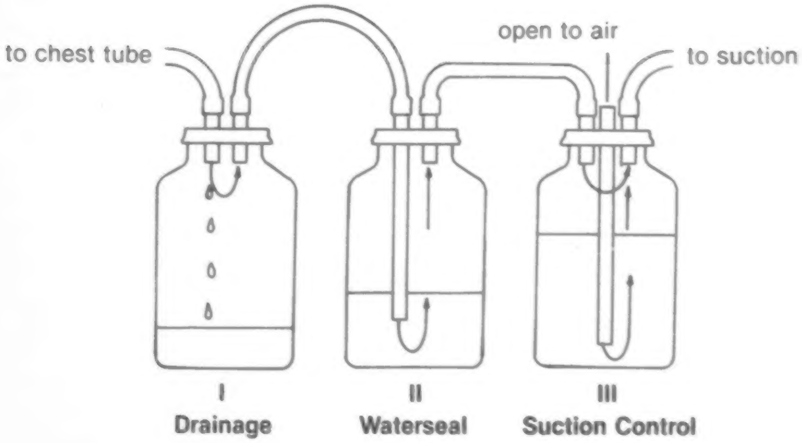
Bottle Chest Drainage Systems


to chest tube
air vent
3-5 cm
normal saline
I
Drainage

One-Bottle System

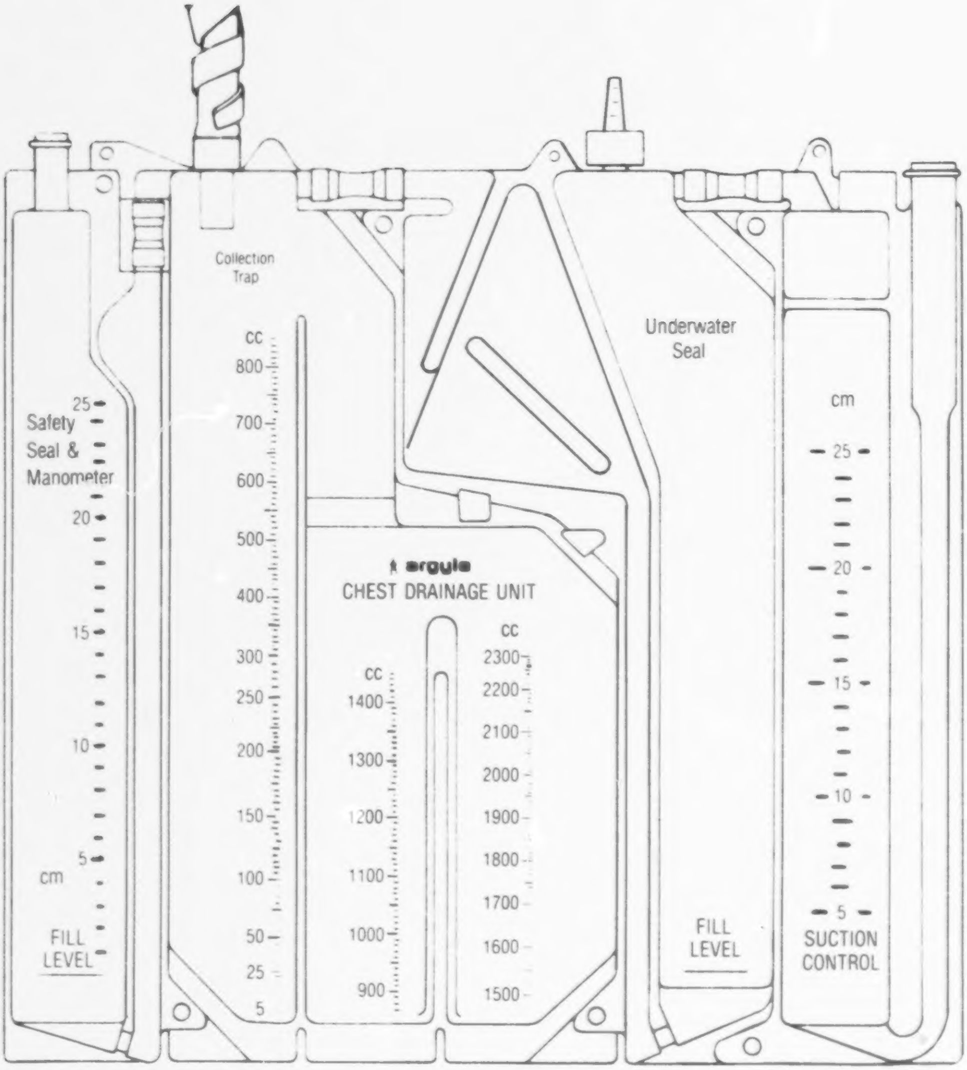

to chest tube
open to air
to suction
I
Drainage & Waterseal
II
Suction Control

Two-Bottle System


to chest tube
open to air
to suction
I
Drainage
II
Waterseal
III
Suction Control

Three-Bottle System

Disposable Chest Drainage Systems


Collection Trap
cc
800
700
600
500
400
300
250
200
150
100
50
25
5
Safety Seal & Manometer
25
20
15
10
5
cm
FILL LEVEL
argyle
CHEST DRAINAGE UNIT
cc
1400
1300
1200
1100
1000
900
cc
2300
2200
2100
2000
1900
1800
1700
1600
1500
Underwater Seal
FILL LEVEL
cm
25
20
15
10
5
SUCTION CONTROL

Thoracic Surgery
Unit 12

Information Sheet

1. **Terms and definitions**

   a. **Bronchial washings** — Secretions obtained from the bronchi for laboratory examination following injection and aspiration of small amounts of saline

   b. **Empyema** — Pus in a body cavity, especially in the pleural cavity

   c. **Flail chest** — Condition of the chest wall due to two or more rib fractures in which rib segments are not attached to the other end causing paradoxic movement during inspiration and expiration

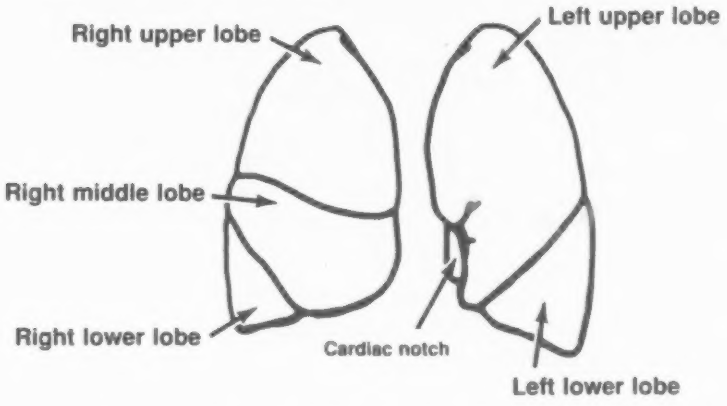
   d. **Hemothorax** — Accumulation of blood or fluid in the pleural cavity caused by rupture of small blood vessels due to trauma or inflammation of the lungs in pneumonia, pulmonary tuberculosis, or a malignant growth

   e. **Hypoxia** — Lack of an adequate amount of oxygen in inspired air; reduced oxygen content or tension

   f. **Intercostal space** — Space between two ribs

   g. **Lobes** — Well-defined portions; the right lung has three, the left lung, two

   Figure 1—Lobes of the lungs



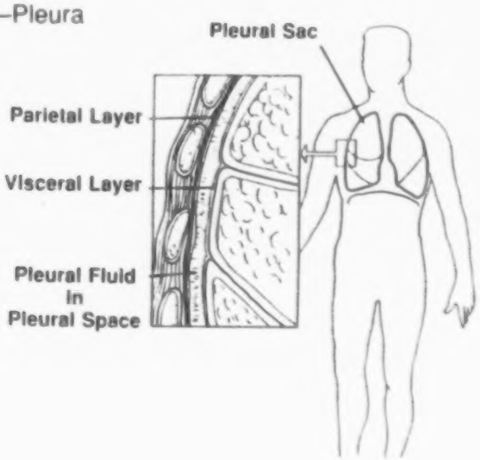
   h. **Pectus carinatum** — Congenital malformation of the chest wall characterized by abnormal prominence of the sternum; often referred to as "pigeon breast"

Information Sheet

i. **Pectus excavatum** — Congenital malformation of the chest wall characterized by a funnel-shaped depression of the lower end of the sternum and costal cartilages

j. **Pleura** — Serous membrane enclosing the lungs and lining the walls of the thoracic cavity

Figure 2—Pleura



k. **Pleural effusion** — Abnormal accumulation of fluid in the pleural space

l. **Pleural space (or intrapleural space)** — Potential space between the parietal and visceral pleurae

m. **Pneumothorax** — Accumulation of air or gas in the pleural cavity, resulting in the collapse of the lung on the affected side (may be closed or open)

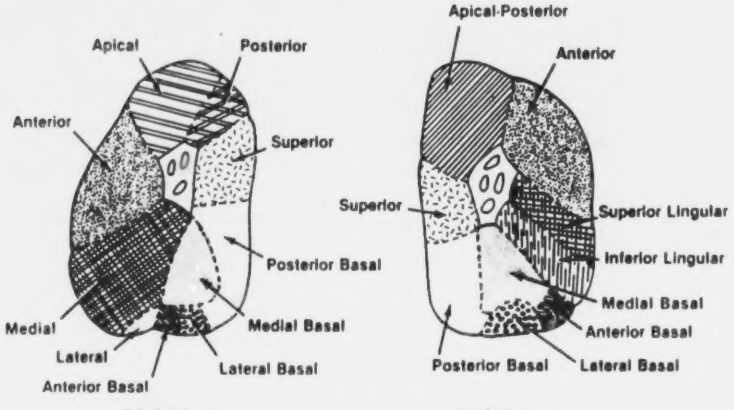
n. **Reserve air** — Maximum volume of air that can be expired from the resting expiratory level

o. **Residual air** — Amount of air remaining in the lungs at the end of a maximum expiration

Information Sheet

p. **Segments of the lung** — Smaller subdivisions of the lobes of the lung, separated from others by connective tissue and supplied by separate branches of the bronchus leading to the particular lobe

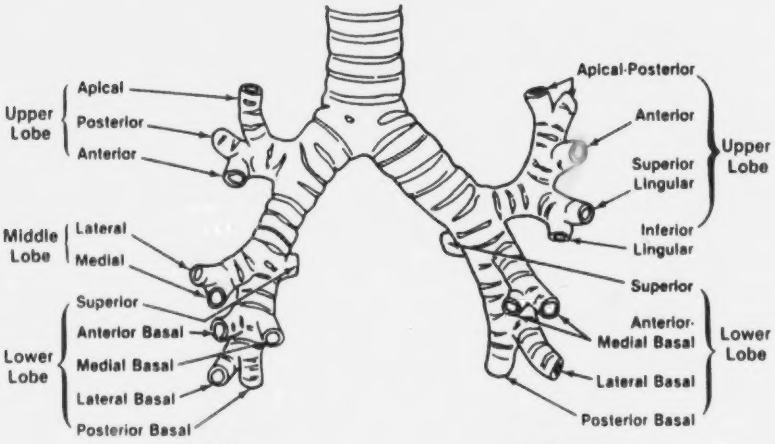
Figure 3—Bronchopulmonary segments


Apical
Posterior
Anterior
Superior
Posterior Basal
Medial Basal
Medial
Lateral
Lateral Basal
Anterior Basal
Apical-Posterior
Anterior
Superior
Superior Lingular
Inferior Lingular
Medial Basal
Anterior Basal
Posterior Basal
Lateral Basal

Right Lung
(Medial View)

Left Lung
(Medial View)

Figure 4—Segmental bronchi


Upper Lobe
Apical
Posterior
Anterior
Middle Lobe
Lateral
Medial
Lower Lobe
Superior
Anterior Basal
Medial Basal
Lateral Basal
Posterior Basal
Apical-Posterior
Anterior
Superior Lingular
Inferior Lingular
Upper Lobe
Superior
Anterior-Medial Basal
Lateral Basal
Posterior Basal
Lower Lobe

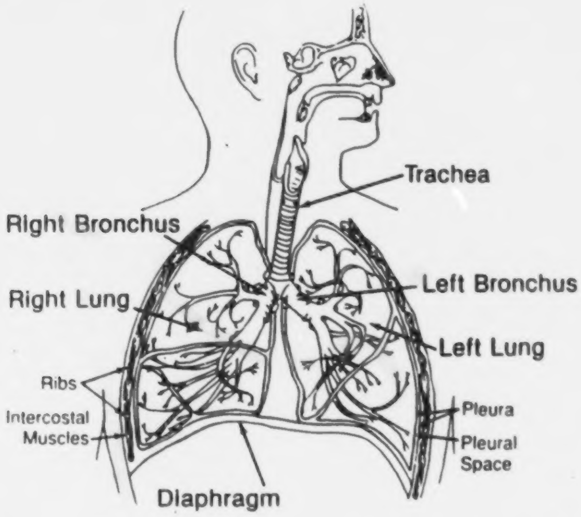
Right Lung **Left Lung**

q. **Suprasternal notch** — Soft indentation along the midline immediately above the sternum

r. **Tidal air** — Amount of air inhaled and exhaled during normal quiet breathing

s. **Thoracic cavity** — Chest; space lying above the diaphragm and below the base of the neck; includes two pleural cavities containing the two lungs, pericardial cavity containing the heart, and the mediastinal space between the lungs, as well as the trachea, esophagus, bronchi, vena cava, and other structures

Figure 5—Thoracic cavity


Trachea
Right Bronchus
Left Bronchus
Right Lung
Left Lung
Ribs
Intercostal Muscles
Pleura
Pleural Space
Diaphragm

t. **Vital capacity (VC)** — Measurement of the amount of air that can be expelled after a maximum inspiration, representing the greatest possible breathing capacity; averages 4000-4800 cc in the adult male

Note: Vital capacity is affected by the patient's age, sex, physical fitness, posture, and pulmonary condition.

2. **Purposes of thoracic surgery**

   a. To diagnose a pathological process by means of endoscopy and/or open biopsy

   b. To treat diseased tissue by resection or repair

   c. To correct a structural deformity

   Example: Pectus excavatum

Information Sheet

3. Special considerations of thoracic surgery

a. A variety of sutures may be used for vessels, soft tissues, and bone.

b. Staples are commonly used to close the bronchus.

c. Sponges for blunt dissection and hemostasis are placed on long, ringed-handled forceps.

d. Hemostatic aids that must be ready at all times may include:

(1) Absorbable gelatin sponges

(2) Cautery

(3) Bone wax

(4) Topical agents

Examples: Thrombin, Avitene®, Gelfilm®

e. Blood for transfusion must be available at all times.

Note: Blood may be salvaged for autotransfusion.

f. Hypothermia blanket or mattress may be used depending on the length of the procedure.

g. Antiemboletic stockings or sequential pneumatic compression devices should be placed on the patient before surgery.

h. Preoperative diagnostic work-up that should be in the operating room during the procedure may include:

(1) X-rays

(2) CT scans

(3) MRI scans

i. General anesthesia is given for most open thoracic procedures.

Note: A double lumen endotracheal tube is used during procedures involving the lungs to permit expansion of the unoperated lung and collapse of the lung on the operative side.

j. General or local anesthesia may be used during endoscopic procedures.

Information Sheet

k. Items that come in contact with an open bronchus are considered contaminated and should be kept isolated from the sterile field.

l. Maintenance of a dry surgical field is imperative to prevent aspiration of blood and/or fluids.

   Note: Aspiration of fluids during operative procedures may cause post-operative pneumonia.

m. A variety of chest-tube and closed drainage systems must be available to reestablish negative pressure in the pleural cavity following open thoracic procedures.

n. Portable x-ray must be available during thoracic procedures.

   Note: Chest x-rays are taken immediately following the procedure to assess lung reexpansion.

o. During open thoracic procedures, the patient requires constant monitoring of temperature, blood loss, urine output, and laboratory results of blood gases.

4. Types of thoracic procedures

a. Endoscopic procedures

b. Operations involving the lung, pleurae, and/or chest wall

c. Operations involving the mediastinum

5. Positions used for thoracic procedures

a. **Modified supine position/dorsal recumbent**

   (1) Used for anterolateral thoracotomy incision, most thoracic endoscopic procedures, and tracheostomy

   (2) For endoscopic procedures, the shoulders are elevated on a small roll or sandbag (which slightly hyperextends the neck) and the head is stabilized on a do-nut ring.

   Note: This position provides easy access to the oropharynx, trachea, bronchus, and anterior mediastinum.

   (3) For anterolateral surgical approach, the operative side is elevated with a sandbag or rolled towel placed under the scapula and buttocks.

Information Sheet

b. **Supine position**

  (1) Used for median sternotomy incision

  (2) Arms are extended on armboards positioned along the sides.

  (3) Provides surgical access to anterior surface of the lungs and structures in the mediastinum.

c. **Lateral position**

  (1) Used for full posterolateral thoracotomy incision

  (2) Provides surgical access to anterior and posterior surfaces of lungs and other thoracic structures

  (3) May also be used for esophagoscopy procedure depending upon surgeon's preference.

6. **Purposes of thoracic endoscopic procedures**

a. To diagnose pathological processes and/or their exact location by obtaining tissue biopsies and/or secretion specimens

Example: Tissue biopsies and bronchial washings are often obtained during a bronchoscopy to help accurately diagnose the exact nature of the patient's disease process.

b. To observe periodically the effects of therapy

c. To remove food or foreign body obstructions

7. **Endoscopic procedures commonly used in thoracic surgery**

a. **Bronchoscopy** — Direct visualization of the tracheobronchial tree following insertion of a rigid or flexible lighted bronchoscope

Note: A rigid scope allows visualization of the trachea and primary bronchi. The flexible scope can be passed into the bronchopulmonary segments.

b. **Esophagoscopy** — Direct visualization of the esophagus and cardiac portion of the stomach by means of a lighted esophagoscope

c. **Laryngoscopy** — Direct visualization of the interior of the larynx through a lighted laryngoscope

Information Sheet

d. **Mediastinoscopy** — Direct visualization of the mediastinal space and lymph nodes by means of a lighted mediastinoscope

e. **Thoracoscopy** — Direct visualization of the pleural space, parietal and visceral pleura, mediastinum, pericardium, and thoracic wall by means of a lighted thoracoscope

8. **Incisional approaches to the thoracic cavity**

   a. **Posterolateral thoracotomy incision**

      (1) Most often used thoracic incision

      (2) Used for complex procedures such as a lobectomy or pneumonectomy

      (3) Incision is made over the rib or intercostal space selected by the surgeon.

      (4) May or may not involve a rib resection

   b. **Anterolateral thoracotomy incision**

      (1) Used for less complex procedures such as lung biopsy

      (2) Inframammary incision is made from anterior midline or sternal border to midaxillary line.

   c. **Median sternotomy incision**

      (1) Used for surgery in the mediastinum such as a thymectomy

      (2) Incision is made over the length of the sternum from the gladiolus to the xiphoid process.

      (3) Sternum is transected with an electric or air-driven saw.

   d. **Thoracoabdominal incision**

      (1) Used for surgery involving the upper abdomen, retroperitoneal area, and lower thoracic cavity

      (2) Incision extends from axilla to abdominal midline running parallel to the selected intercostal space (usually the seventh or eighth)

      (3) Incision may be extended posteriorly from within the thoracic cavity.

Information Sheet

9. Operations on the lung

a. **Closed thoracostomy** — Insertion of a catheter (chest tube) through a very small incision in an intercostal space to establish a closed drainage system

   Note: This is performed when the intake of a large amount of air and collapse of the lung is undesirable.

b. **Decortication of the lung** — Excision of fibrinous deposits or restrictive membranes of pleurae that interfere with respiratory function

c. **Lobectomy** — Removal of one or more diseased lobes of the lung

d. **Lung biopsy** — Excision of a small portion of lung tissue for diagnosis

e. **Pneumonectomy** — Removal of an entire lung, commonly performed to treat carcinoma of the lung

f. **Rib resection** — Removal of a segment of a rib or the entire rib

g. **Segmental resection of the lung** — Removal of an individual bronchovascular segment of a pulmonary lobe with ligation of segmental branches of pulmonary vessels and division of the segmental bronchus

h. **Thoracic outlet syndrome** — Resection of the first rib to relieve chronic pain caused from injury to the anterior and/or middle scalene muscles

   Note: This procedure may be used when conservative treatment fails to relieve pain.

i. **Thoracoplasty** — Resection of several ribs in order to induce a permanent collapse of the lung

j. **Thoracotomy** — Incision into the thoracic cavity to provide access to organs of the chest

k. **Transplantation** — Transplant of either one or both lungs; used for patients with obstructive lung disease, cystic fibrosis, or end-stage pulmonary fibrosis

l. **Wedge resection of the lung** — Excision of a small part from the periphery of a pulmonary lobe

   Note: Unlike the segmental resection, this procedure does **not** involve ligation of segmental blood vessels or division of the segmental bronchus.

Information Sheet

10. Procedures on the mediastinum

a. **Esophagectomy** — Resection of the upper, middle, or lower third of the esophagus with anastomosis of the stomach, small intestine, or large intestine.

Note: Esophageal resections may or may not involve the thoracic cavity depending on location of the pathology and physician's preference.

b. **Repair of hiatal hernia**

(1) Repair of herniation of the stomach through the diaphragm.

(2) Thoracic approach may be preferred when:

(a) Patient is obese.

(b) Hernia is recurrent.

(c) Hernia is incarcerated.

(d) Hernia is caused by blunt trauma.

(e) Hernia is caused by a penetrating abdominothoracic wound.

c. **Repair of pectus excavatum/carinatum** — Correction of deformities of the sternum and/or costal cartilage of the anterior chest wall

d. **Thymectomy** — Excision of the thymus gland, with or without en bloc resection

Note: This procedure may be performed to relieve symptoms of myasthenia gravis.

11. Specialized instruments for thoracic surgery

a. **Contractors/approximators** — Closing instruments used to bring ribs and sternum back into proper alignment after retraction; name of contractor and approximator indicates its use

(1) Rib contractor (Bailey)

(2) Sternal approximator (Lemmon)

Information Sheet

b. **Forceps, specialized** (many types) — Grasping/holding instruments used to grasp the various tissues of the thoracic cavity; name of forcep typically indicates type of tissue to be grasped,

   (1) Lung grasping forceps (Duval, Lovelace)

   (2) Artery forceps (Schnidt, Sarot)

   (3) Bronchus clamp (Sarot, Lee)

   (4) Thoracic forceps (Mixter, Harrington, Rumel, Kantrowitz, Finochietto)

   (5) Tissue forceps (Allis, Babcock, Kelly)

c. **Periosteal elevator/stripper and periosteotome** — Cutting/dissecting instruments used to free, cut, and strip the periosteum from the bone; name indicates its use

   (1) Periosteal elevator (Overholt, Sedillot)

   (2) Rib stripper/elevator (Matson)

   (3) Costal periosteotome (Alexander-Farabeuf)

d. **Raspatories** — Cutting instruments used to smooth bone surfaces (Doyen, Semb)

e. **Retractors/spreaders** (many types) — Exposing instruments used to retract or spread bone and tissues of the thoracic cavity; name of retractor/spreader indicates its use on tissues or bone

   (1) Scapula retractor (Davidson)

   (2) Lung retractor (Allison)

   (3) Sternal retractor (Morse, Cooley)

   (4) Rib spreader (Finochietto, Burford-Finochietto, Tuffier)

f. **Rib shears** — Cutting instruments used to remove a rib or rib segments (Shoemaker, Sauerbauch, Bethune, Gierty, and Gluck)

g. **Sternal chisel/knife** — Cutting instrument used to transect or remove a segment of the sternum (Lebsche)

h. **Sternal saw** — Cutting instrument used to transect the sternum

Information Sheet

12. Underwater chest drainage systems

a. System consists of one or more chest tubes connected to a closed drainage unit or bottles.

b. System is used to reestablish negative intrapleural pressure and/or to drain air, blood, or other fluid from the thoracic cavity.

c. Drainage is indicated for:

  (1) Closed pneumothorax

  (2) Open pneumothorax

  (3) Hemothorax

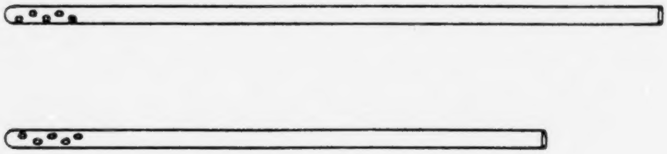
  (4) Blunt trauma to chest causing paradoxic motion of the thoracic cage

  (5) Pleura abscesses or empyema

  (6) Any combination of the above

d. Chest tubes (thoracic catheters) are sterile tubes with multiple openings in the end available in a variety of sizes from 16-36 French.

Figure 6—Chest tubes



e. Chest tubes are connected to a sterile, water-seal drainage system.

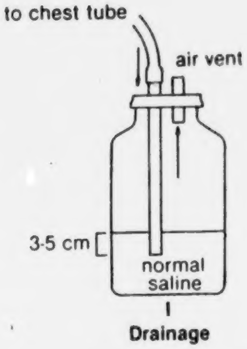
Note: Water-seal suction may be necessary when a persistent air leak may not be controlled by drainage alone.

Information Sheet

f. Water-seal drainage systems are available as bottle systems or disposable units.

(1) One-bottle system may be used for minimal drainage and to provide seal for lung expansion.

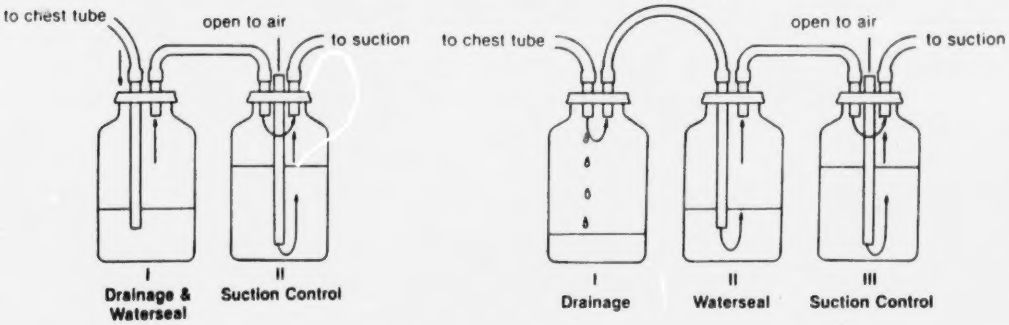
Figure 7—One-bottle system


to chest tube
air vent
3-5 cm
normal saline
I
Drainage

(2) Two- and three-bottle systems connected to suction are traditionally used.

Example: Emerson® bottles

Figure 8—Two-bottle and three-bottle systems


to chest tube
open to air
to suction
I
Drainage & Waterseal
II
Suction Control
to chest tube
open to air
to suction
I
Drainage
II
Waterseal
III
Suction Control

Information Sheet

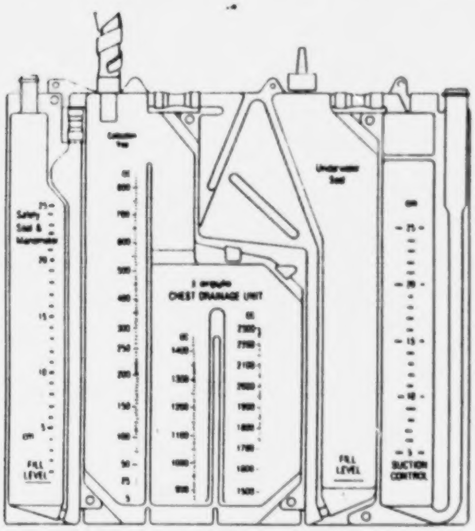
(3) Compact disposable units are available and are adaptable to act as a one-, two-, or three-bottle system.

   (a) These systems may have autotransfusion attachments.

   (b) Disposable units are usually preferred because they are lighter, safer, easier to use, and more readily transportable.

   Examples: Pleur-Evac®, Thoraclex®, Antrium®

   Figure 9—Example of disposable chest drainage unit


Safety Seal & Manometer
FILL LEVEL
CHEST DRAINAGE UNIT
FILL LEVEL
SUCTION CONTROL

g. Principles of operation

(1) One-bottle system collects drainage and provides water seal.

(2) Two-bottle system

   (a) First bottle collects drainage and provides water seal.

   (b) Second bottle provides suction control.

(3) Three-bottle system

   (a) First bottle collects drainage.

   (b) Second bottle provides water seal.

   (c) Third bottle provides suction control.

Information Sheet

h. Preparation and usage

(1) Tubes and closed system must be sterile.

(2) Technologist assembles the chest bottle system using sterile technique and adds appropriate amount of **normal saline** solution to bottle.

Note: The amount to be used will depend on the type of drainage system used.

Caution: Never use sterile water to fill water-seal chamber as it is not compatible with body fluids or tissues.

(3) Surgeon inserts tubes prior to closure of the chest wound and clamps them until they can be connected to the drainage system.

(4) If two tubes are inserted (one for air near top of intrapleural space and one for fluid near bottom of intrapleural space), they may be connected to one drainage system with a Y-connector or they may be attached to separate drainage systems.

(5) Points of connections must be banded or taped to prevent interruption of the system.

(6) Bottles or closed unit must be kept below body level to prevent readmittance of air or fluid back to cavity which could result in pneumothorax and collapse of the lung.

(7) Clamps for the tubing should **always** be available as a precautionary measure in case of interruption of system.

13. Procedure for an open thoracotomy with rib resection

a. Surgeon incises over selected intercostal space through skin, subcutaneous tissue, and muscle layers, and cauterizes or clamps and ligates bleeding vessels.

b. Periosteum over the intercostal space is incised by the surgeon and freed from the rib with a periosteal elevator, raspatory, and/or scissors.

Note: The vascular periosteum is preserved in order to promote postoperative healing.

c. Surgeon removes the rib or rib segment with rib shears.

Information Sheet

d. Surgeon trims bone edges with a rongeur or Sauerbruch rib shears and applies bone wax for hemostasis.

e. Technologist hands surgeon moist lap sponges to cover and protect wound from retractor edges and passes to surgeon the retractor of choice which is then inserted between ribs and opened slowly.

f. Surgeon incises pleura, frees adhesions, and explores chest, suctioning as necessary, in order to locate pathology.

g. Surgeon performs procedure of choice.

h. After specific procedure has been performed, the surgeon inserts one or two chest tubes (28-30 Fr for adult) in the pleural space and brings them through a stab wound near the anterior axillary line at the eighth or ninth intercostal space.

Note: An upper tube may be inserted through a second stab wound if leaking air is to be evacuated.

i. Chest tubes are clamped until connected to a water-seal drainage system.

j. Surgeon places heavy pericostal sutures around the two ribs and holds the ends of each suture with a hemostat, uses a Bailey rib contractor to reapproximate ribs, and ties pericostal sutures and cuts ends.

k. Surgeon reapproximates periosteum with a running absorbable suture, closes muscle layers, superficial fascia, subcutaneous tissue, and skin with sutures of choice, and anchors drains to chest wall and connects to closed drainage system. Chest tube clamps are removed.

l. Technologist applies dressings according to surgeon's preference.

Thoracic Surgery
Unit 12

Student Supplement 1—Review Anatomy of the Lungs

Name ______________________________ Date ________________

Directions: Identify the following lobes of the lung, and place your answers in the blanks provided.

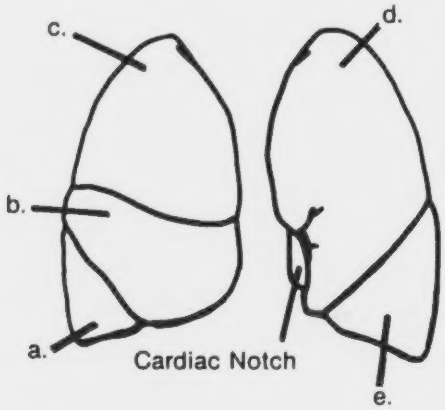
a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________



Thoracic Surgery
Unit 12

Student Supplement 2—Review Anatomy of the Thoracic Cavity

Name ______________________ Date ______________

Directions: Identify the following structures of the thoracic cavity, and place your answers in the blanks provided.

a. ______________________

b. ______________________

c. ______________________

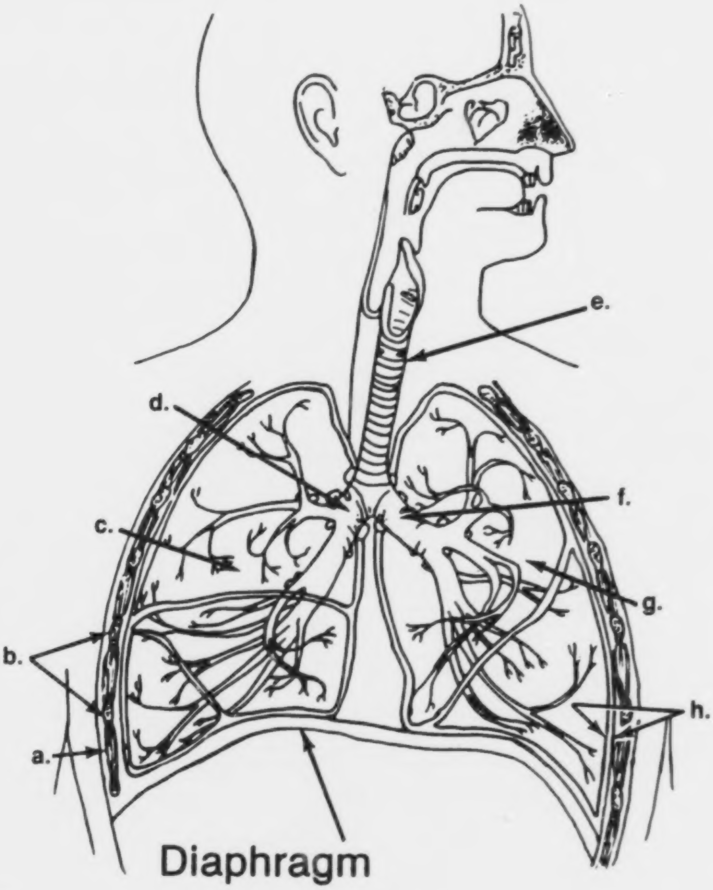
d. ______________________

e. ______________________

f. ______________________

g. ______________________

h. ______________________



Thoracic Surgery
Unit 12

Assignment Sheet 1—Determine Needs for Given Thoracic Surgery Cases

Name ______________________ Overall Rating __________

Evaluation criteria	**Rating**
Answers are appropriate	_____
Word are spelled correctly	_____

Directions: Read each of the following cases, and fill in the blanks with the appropriate information. Refer to the information sheets as needed.

Case A: An eight-year-old male is scheduled to have a foreign object removed from the primary bronchi.

1. What is this procedure called? ______________________
2. What type of anesthesia will most likely be used? ______________________
3. What position will be used? ______________________
4. List four supplies and equipment needed for this procedure.
    a. ______________________
    b. ______________________
    c. ______________________
    d. ______________________
5. Describe two special considerations to follow involving care of this patient.
    a. ______________________
    b. ______________________

Assignment Sheet 1

Case B: A thirty-six-year-old female is scheduled to have a lymph nodes biopsy and exploration of the mediastinal space.

1. What is this procedure called? ______________________________
2. What type of anesthesia will most likely be used? ______________________________
3. What position will be used? ______________________________
4. List four supplies and equipment needed for this procedure.
    a. ______________________________
    b. ______________________________
    c. ______________________________
    d. ______________________________
5. Describe two special considerations to follow involving care of this patient.
    a. ______________________________
    b. ______________________________

Case C: A fifty-nine-year-old male is scheduled to have a segmental resection of the right lower lobe of the lung.

1. What type of anesthesia will be used? ______________________________
2. What position will be used? ______________________________
3. What type of incision will be used? ______________________________
4. What instrumentation will most likely be required? ______________________________

    ____

    ____

Assignment Sheet 1

5. List seven supplies that may be needed.

   a. ______

   b. ______

   c. ______

   d. ______

   e. ______

   f. ______

   g. ______

6. Describe the care needed for instruments that have come into contact with the bronchus. ______

   ______

7. Describe two special considerations to follow involving care of this patient.

   a. ______

   b. ______

Thoracic Surgery
Unit 12

Job Sheet 1—Connect Chest Tube to Disposable Chest Drainage System

Name ______________________ Attempt Number ________

Date ______________________ Overall Rating ________

Evaluation criteria	**Rating**
Assembled necessary supplies and equipment	______
Followed directions	______
Performed each step in appropriate sequence	______
Work is neat and secure	______

Instructions: When you are ready to perform this task, ask your instructor to observe the procedure and rate your performance using the evaluation criteria.

A. Equipment and materials

Disposable chest drainage system (such as Pleur-Evac®)
Syringe—60 cc irrigating
Sterile water
Connecting tubing
Straight connector
Dressing material
Tape and scissors
Two clamps
Scrub and patient

B. Procedure

☐ 1. Cleanse incision and chest tube insertion site.

☐ 2. Using irrigating syringe and sterile water, fill underwater seal chamber to appropriate level according to package directions.

Note: This may be filled by the circulator.

☐ 3. Place straight connector between chest tube and connecting tubing.

Job Sheet 1

☐ 4. Attach connecting tubing to drainage unit (Pleur-Evac®) if suction is to be used.

☐ 5. Tape all connections securely.

☐ 6. Apply dressing to insertion site.

Note: Keep Pleur-evac **below** chest level.

Caution: Should the bottle break or the chest tube become disconnected, apply two clamps to the tubing.

Evaluator's comments: ____

____

____

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Objective Sheet

Unit Objective

After completing this unit, the student should be able to match cardiovascular and peripheral vascular surgery with the correct descriptions and determine needs for given surgical cases. The student should demonstrate these competencies by completing the assignment sheet and by scoring a minimum of 85 percent on the written test.

Specific Objectives

After completing this unit, the student should be able to:

1. Match terms related to cardiovascular and peripheral vascular surgery with their correct definitions.
2. Match special supplies and equipment used in cardiovascular and peripheral vascular surgery with the correct descriptions.
3. Match drugs commonly used in cardiovascular and peripheral vascular surgery with the correct uses.
4. Distinguish between two common diagnostic procedures used in cardiovascular and peripheral vascular surgery.
5. Complete statements concerning cardiovascular and peripheral vascular pathology.
6. Distinguish among types of aortic aneurysms.
7. Match congenital anomalies of the cardiovascular system with the correct descriptions.
8. Complete statements concerning special considerations of cardiovascular surgery.
9. List specialized instruments for cardiovascular surgery.
10. Complete statements concerning cardiopulmonary bypass (extracorporeal circulation.)
11. Match procedures requiring cardiopulmonary bypass with the correct descriptions.

Objective Sheet

12. Complete statements concerning procedures that do *not* require cardiopulmonary bypass.

13. Arrange in order the procedure for the insertion of transvenous electrodes and implantation of a permanent pacemaker.

14. Select true statements concerning special considerations of peripheral vascular surgery.

15. Match peripheral vascular operations with the correct descriptions.

16. Complete statements concerning the procedure for an abdominal aortic aneurysmectomy with graft implantation.

17. Arrange in order the procedure for an arterial embolectomy.

18. Complete statements concerning the procedure for a carotid endarterectomy.

19. Determine needs for given cardiovascular and peripheral vascular surgery cases. (Assignment Sheet 1)

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Suggested Activities

Instructional Plan

Preparation

1. Read the unit carefully and plan for instruction.

2. Review Teaching Suggestions section that follows. Plan for classroom activities.

3. Plan for students with special needs.

4. Make transparencies from the transparency masters included with this unit. These appear in the teacher edition only and are designed to be used with the following objectives:

   TM 1—Structure of the Heart (Objective 1)
   TM 2—Layers of Blood Vessels (Objective 1)
   TM 3—Cardiovascular Supplies—Prosthetic Patches and Grafts (Objective 2)
   TM 4—Cardiovascular Supplies—Prosthetic Heart Valves (Objective 2)
   TM 5—Cardiovascular Supplies—Continued (Objective 2)

5. Obtain films, videotapes, and other resources to supplement instruction of this unit. See ordering information in the Suggested Supplemental Resources section that follows.

6. Develop teaching plan. Adjust for different learning styles.

7. Make copies of the Unit Evaluation Form, which follows the written test section.

Delivery and Application

8. Provide students with unit of instruction.

9. Discuss unit and specific objectives.

10. Discuss information sheet. Implement teaching plan to localize, supplement, and personalize the unit. Reinforce basic academic and workplace skills when applicable.

11. Discuss the student supplements. This could be used as homework assignments, practice exercises, or quizzes. Explain to students how you plan to evaluate the supplements, if at all.

Suggested Activities

12. Discuss the assignment sheet. Review criteria for evaluation of this activity.

Evaluation

13. Discuss the use of the Unit Evaluation Form with students. Discuss the rating scale that will be used for student evaluation.

14. Make copies of the written test. Add or modify test items as needed.

15. Give written test.

16. Compile assignment sheet ratings and written test scores on the Unit Evaluation Form. Include any additional assignments or supplemental activities that should be part of the unit evaluation.

17. Reteach and retest as required.

Teaching Suggestions

Note: Skill areas appearing in boldface type in the Teaching Suggestions refer to the academic and workplace skills identified by the American Society for Training and Development (ASTD) and the U.S. Department of Labor. These have been adapted by MAVCC.

1. Review anatomy, physiology, and pathology as they relate to cardiovascular and peripheral vascular surgery. You may wish to divide the class into teams that compete in a review game with tokens or prizes for the winning team. **Personal management skills, group effectiveness skills**

2. Set up your laboratory area for this specialty area. Stock supplies and equipment that students will need.

3. Invite a sales representative to talk to the class about the specialized supplies, instruments, and equipment required in cardiovascular and peripheral vascular surgery. Have the representative show actual examples if possible, as well as brochures and catalogs of products. Point out new products that may not be included in this unit. **Listening communication skills**

4. Make a display of the basic and specialized instruments that are required in cardiovascular and peripheral vascular surgery. If you do not have access to the specialized instruments, show them to your students during their clinical work in this specialty area. You should also provide specialty instrument catalogs so students can practice identifying the instruments.

Suggested Activities

6. Discuss the cost and care of specialty instruments. Provide price lists for specialty instrument catalogs or call for price quotes on several examples of common instruments used in cardiovascular and peripheral vascular surgery. Understanding cost can help students appreciate the value of instruments and the need for proper care and handling to extend the life of instruments. **Communication skills, adaptability skills, organizational effectiveness skills**

7. Invite a surgeon, circulator, or surgical technologist to talk to the class about the most current and most common procedures performed in cardiovascular and peripheral vascular surgery. Have the speaker cover the following for each basic procedure:

   a. Diagnosis that brings the patient to surgery
   b. Preoperative work ups
   c. Highlights of the surgical procedure (including instruments and anatomical structures)
   d. Postoperative course

   Let the students know beforehand that there will be a quiz based on the speaker's lecture. Have students take notes and ask questions as needed. **Foundation skills, communication skills, personal management skills, influence skills**

8. Have assigned students give oral reports on their research about cardiovascular and peripheral vascular surgery. Reports should focus on the most current advancements, most exciting innovations, or most dramatic changes that will affect them as surgical technologists when they are working in cardiovascular and peripheral vascular surgery. **Foundation skills, communication skills, personal management skills, influence skills**

   Note: Assigning oral report topics to different students for each surgical specialty was a teaching suggestion in Unit 1. The length of the report, number of references, and grading criteria should have been established then. Make sure students have access to adequate resources to prepare their reports.

9. Divide students into groups, and assign each group a different procedure commonly performed in cardiovascular and peripheral vascular surgery. Have them research local surgeons' preferences and instrumentation. They should be ready to teach the other groups about the needed supplies, instruments, basic set ups, positions, preps, drapes, and steps in the procedure. You may wish to have students move from station-to-station or have each group give one presentation to the entire class. Instruments and Mayo set ups may have to be simulated with paper cutouts. A different approach would be for everyone to work on the same procedure but with each group assigned only one aspect such as positioning, prepping, etc. **Foundation skills, communication skills, group effectiveness skills, influence skills**

Suggested Activities

10. Show videos of procedures common to cardiovascular and peripheral vascular surgery. These could be commercially produced or ones made by you, a local medical facility, or a university teaching hospital. **Communication skills**

11. Provide clinical orientation and guided clinical practice of cardiovascular and peripheral vascular surgery. Discuss the differences and similarities between clinical settings. Provide "Policy and Procedure" manuals, and discuss any variations from this unit's guidelines. Discuss counts required in each setting. **Learning skills, communication skills, adaptability skills, personal management skills, influence skills**

Resources Used in Developing This Unit

1. Allmers, Nancy and Joan Verderame. *Review for The Surgical Technology Examination*, 3rd ed. Connecticut: Appleton and Range, 1993.

2. Atkinson, Lucy. *Berry & Kohn's Introduction to Operating Room Technique*, 7th ed. St. Louis: C. V. Mosby Co., 1992.

3. *Core Curriculum for Surgical Technology*. Littleton, CO: Association of Surgical Technologists, 1990.

4. Fuller, Joanna. *Surgical Technology: Principles and Practice*, 3rd ed. Philadelphia: W. B. Saunders Co., 1993.

5. Meeker, Margaret Huth and Jane C. Rothrock. *Alexander's Care of the Patient in Surgery*, 9th ed. St. Louis: Mosby Year Book, Inc., 1991.

6. Seifert, Patricia C. *Cardiac Surgery*. St. Louis: Mosby-Year Book, Inc., 1994.

7. Tighe, Shirley M. Brooks. *Instrumentation for the Operating Room*, 3rd ed. St. Louis: C. V. Mosby, 1989.

Suggested Supplemental Resources

1. *Mechanical Heartbeats*, 19-minute videotape that features two cardiomyopathy patients: one maintained on a left ventricular assist device (LVAD) while awaiting a suitable donor heart, the other having already had the transplant operation with a prior temporary LVAD implant.

2. *Heart Valves: Repairing the Heart*, 19-minute videotape that explains aortic valve stenosis and options for treating it, including mechanical valves and aortic valvuloplasty.

Suggested Activities

3. *Pacemakers: The Electric Heartbeat*, 19-minute videotape that illustrates the function of the pacemaker, new advances, and use of the automatic internal cardioverter defibrillator (AICD).

4. *Heart Surgery: New Choices*, 19-minute videotape that examines the changing role of coronary bypass surgery. Explains functions of various corrective procedures.

5. *Heart Surgery*, 19-minute videotape that explains various types of heart surgery, including coronary artery bypass, valve replacement, heart transplant, and artificial heart implant. Also looks at emerging techniques.

6. *New Hearts for Sick Kids*, 19-minute videotape that focuses on the options to the parents of an infant with hypoplastic heart syndrome.

   1 - 6 are available from:

   Films for the Humanities and Sciences
   P.O. Box 2053
   Princeton, NJ 08543-2053
   800-257-5126 or 609-452-1128

7. *Heart Diagnostic Tests Series*, a series of 5 videos that explains and illustrates tests for diagnosing ailments of the heart. Each is approximately 10 minutes.

   a. *Electrocardiogram and Holter Monitor*

   b. *Exercise Stress Test and Exercise Echocardiogram*

   c. *Echocardiogram and Carotid Duplex Scan*

   d. *Thallium Scan and Cardiac Blood Pool Imaging*

   e. *Coronary Angiography*

   These videos are available individually or as a set from:

   AIMS Media
   9710 DeSoto Avenue
   Chatsworth, CA 91311-4409
   800-367-2467 or 818-773-4300

8. *The Implantable Cardioverter Defibrillator*, 20-minute videotape that discusses how ICDs work, components of an ICD system, preimplant testing, surgical options, and postimplant care.

Suggested Activities

9. *The Operation: Coronary Artery Bypass*, 60-minute videotape that shows a triple coronary artery bypass procedure.

10. *Coronary Angiography and P.T.C.A.*, 14-minute videotape shows patient and family about cardiac catheterization and percutaneous transluminal coronary angioplasty.

    8 - 10 are available from:

    American Journal of Nursing Company
    Educational Services Division
    555 West 57th Street
    New York, NY 10019-2961
    800-CALL AJN

11. Many videos detailing cardiovascular and peripheral vascular surgery are also available from:

    ACS/Davis + Geck Video Library
    c/o Cine-Med, Inc.
    127 Main Street North
    P.O. Box 745
    Woodbury, CT 06798
    800-633-0004 or 203-263-0080

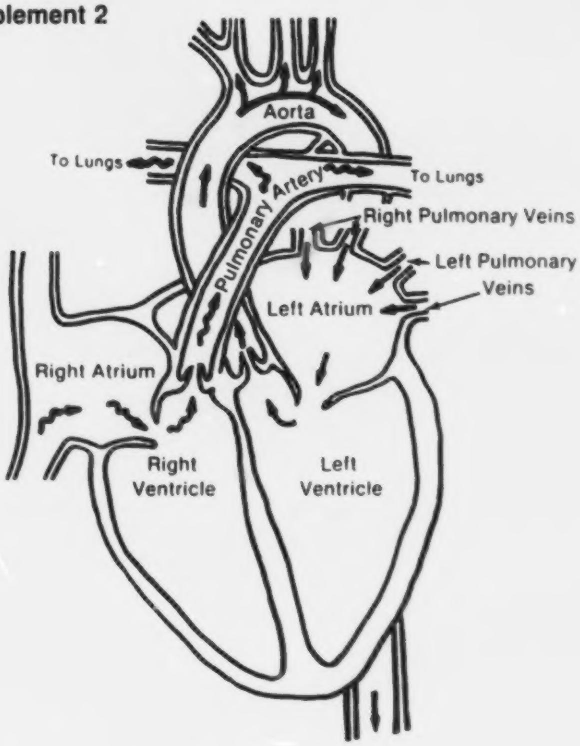
Cardiovascular and Peripheral Vascular Surgery
Unit 13

Answers to Student Supplements

Student Supplement 1

a. Superior vena cava
b. Right atrium
c. Inferior vena cava
d. Tricuspid valve
e. Right ventricle
f. Endocardium
g. Myocardium
h. Pericardium
i. Septum
j. Left ventricle
k. Bicuspid or mitral valve
l. Left atrium
m. Pulmonary veins
n. Pulmonary semilunar valve
o. Aortic semilunar valve
p. Pulmonary artery
q. Aorta
r. Innominate artery
s. Right subclavian artery
t. Right common carotid artery
u. Left common carotid artery
v. Left subclavian artery

Student Supplement 2


Aorta
To Lungs
To Lungs
Pulmonary Artery
Right Pulmonary Veins
Left Pulmonary Veins
Left Atrium
Right Atrium
Right Ventricle
Left Ventricle

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Answers to Assignment Sheet 1

Case A: Permanent pacemaker

1. Any one of the following: Bradycardia, arrhythmias, or other reasons as appropriate
2. Supine
3. Fixed rate and demand
4. Right ventricle (apex)
5. In a pocket in the chest (or abdominal) wall
6. Instructor should evaluate for completeness and appropriate arrangement.

Case B: Carotid endarterectomy

1. Any one of the following: To restore circulation to brain caused by clogged carotid artery, to treat neurological problems such as stroke or transient ischemic attacks caused by clogged carotid artery, or other reasons as appropriate
2. From middle of ear down the neck to the axilla. Also right or left lower leg if saphenous vein patch is needed.
3. Vertical incision is made along the anterior border of the sternocleidomastoid muscle.
4. Common carotid (and internal and external carotids if necessary)
5. Heparin
6. Instructor should evaluate for completeness and appropriate arrangement.

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Answers to Written Test

1.	a.	13	h.	11	o.	27
	b.	16	i.	12	p.	22
	c.	6	j.	10	q.	19
	d.	4	k.	9	r.	28
	e.	8	l.	20	s.	17
	f.	5	m.	21	t.	24
	g.	1	n.	18		
2.	a.	5	f.	13		
	b.	10	g.	3		
	c.	4	h.	7		
	d.	11	i.	9		
	e.	6	j.	12		
3.	a.	9	e.	6		
	b.	2	f.	3		
	c.	7	g.	4		
	d.	8				
4.	a.	CC				
	b.	A				
5.	a.	Coronary artery disease				
	b.	Valvular stenosis				
	c.	Arteries and veins				
	d.	Aneurysm				
	e.	Arteriosclerosis				
	f.	Heart block				
	g.	Atherosclerosis				
	h.	Valvular insufficiency				
	i.	Varicose veins				
6.	a.	T				
	b.	F				
	c.	C				
	d.	D				
	e.	S				

Answers to Written Test

7. a. 3
   b. 6
   c. 1
   d. 2
   e. 4

8. a. Operating room
   b. Crash cart
   c. Chart
   d. Anxiety
   e. Hyper/hypothermia
   f. Following
   g. Urinary catheter
   h. Rectum
   i. During
   j. Surgeon
   k. Thoracic
   l. Label
   m. Specimens

9. Any four of the following:

   a. Cardiovascular scissors (Potts-Smith, DeBakey-Potts)
   b. Vena cava clamps (Satinsky, Derra)
   c. Coarctation clamps (Crafoord, Cooley)
   d. Aorta clamps (Johns Hopkins, DeBakey, Kay)
   e. Bulldog clamps (Johns Hopkins, Glover, DeBakey)
   f. Patent ductus clamps (Glover, Cooley)
   g. Needle holders (DeBakey, Cooley)

10. a. Temporarily divert blood flow
    b. Oxygenates
    c. (1) Inferior and superior vena cavae
       (2) Arterial cannula

11. a. 6
    b. 4
    c. 5
    d. 1
    e. 2

12. a. Aorta, pulmonary artery
    b. Coarctation
    c. Pulse generator
    d. Internal defibrillator
    e. Angioplasty

Answers to Written Test

13.	a.	7	h.	6		
	b.	3	i.	14		
	c.	8	j.	4		
	d.	2	k.	1		
	e.	5	l.	10		
	f.	13	m.	9		
	g.	11	n.	12		
14.	a.	T	e.	T		
	b.	T	f.	T		
	c.	F	g.	F		
	d.	F				
15.	a.	7	d.	3		
	b.	4	e.	6		
	c.	9	f.	1		
16.	a.	2	d.	3		
	b.	2	e.	1		
	c.	4	f.	2		
17.	a.	8	e.	7	i.	2
	b.	3	f.	5	j.	6
	c.	4	g.	10	k.	12
	d.	11	h.	1	l.	9
18.	a.	3				
	b.	1				
	c.	2				
	d.	3				

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Written Test

Name ______________________ Date ______________ Score ______

1. Match the terms on the right with the correct definitions.

Note: The terms on this page match the definitions on this page only.

______a. Rapid, tremulous, ineffectual contractions of the heart

______b. Pertaining to the heart muscle

______c. Pertaining to the heart and lungs

______d. Separation into two branches; the point of forking

______e. Slightly blue-gray discoloration of the skin due to reduced amounts of hemoglobin in the blood

______f. Tube or sheath allowing the escape of fluid

______g. Irregularity or loss of rhythm of the heartbeat

______h. Within the heart or arising from the inner lining of the heart

______i. Outside of the body

______j. Mass of undissolved matter present in or traveling through a blood vessel, usually an artery

______k. Stopping fibrillation of the heart through the use of drugs or by physical or electrical means

1. Arrhythmia
2. Atheromatous
3. Autogenous
4. Bifurcation
5. Cannula
6. Cardiopulmonary
7. Cinematoradiogram
8. Cyanosis
9. Defibrillation
10. Embolus
11. Endocardial
12. Extracorporeal
13. Fibrillation
14. Lumen
15. Metabolic acid
16. Myocardial

Written Test

Note: Terms on this page match the definitions on this page only.

______l. Cardiac arrhythmia characterized by a ventricular beat preceding the expected electrical impulse; may be a precursor of ventricular tachycardia or fibrillation

______m. Wall dividing two cavities, such as the chambers of the heart

______n. Serving to relieve or alleviate, without curing

______o. Inner lining of a blood vessel

______p. Constriction or narrowing of a passageway

______q. Patch of atherosclerosis consisting of cholesterol, lipids, and cellular debris that forms in the inner layers of the walls of arteries

______r. Narrowing of the caliber of blood vessels

______s. Abnormal closure of a passageway such as a blood vessel

______t. Blood clot that obstructs a blood vessel or a cavity of the heart

17. Occlusion
18. Palliative
19. Plaque
20. Premature ventricular contraction
21. Septum
22. Stenosis
23. Thrombosis
24. Thrombus
25. Trabecula carneae
26. Transient ischemic attack
27. Tunica intima
28. Vasoconstriction

Written Test

2. Match special supplies and equipment used in cardiovascular and peripheral vascular surgery listed on the right with the correct descriptions.

______a. Used to increase or decrease body temperature or to maintain adequate temperature during lengthy peripheral vascular procedures

______b. Teflon or Dacron materials available in a variety of forms used to strengthen a suture line or to cover or reinforce a defect

______c. Teflon or Dacron materials available in a variety of types and sizes used to replace a segment of an artery that has been surgically resected because of an abnormality; two most common types are knitted and woven and both are available in straight or bifurcated forms

______d. Heterograft, homograft, or artificial implants designed to replace defective heart valves

______e. Electrical device that substitutes for a defective natural pacemaker

______f. Used following cardiac procedure to drain air, fluid, or a combination from the patient's chest

______g. Used for recording electricity variations in action of heart muscles; monitors the heart's activity during most surgical procedures

______h. Electrical implant device used to administer electrical shocks to the heart during ventricular fibrillation or ventricular tachycardia

______i. Tubes with multiple eyes used to flush an artery by injecting heparinized saline solution to prevent further clot formation

______j. Artificial tubes used to divert blood flow from one main route to another or around an obstruction

1. Arterial embolectomy and venous thrombectomy Fogarty catheters
2. Defibrillator and paddles
3. Electrocardiograph
4. Grafts
5. Hypo/hyperthermia unit
6. Internal artificial pacemaker
7. Internal defibrillator
8. Intra-aortic balloon pump
9. Irrigating Fogarty catheters
10. Patches
11. Prosthetic heart valves
12. Shunts
13. Underwater chest drainage systems

Written Test

3. Match drugs commonly used in cardiovascular and peripheral vascular surgery listed on the right with the correct uses.

_______a. Buffer used to prevent or correct metabolic acidosis

_______b. Increases cardiac output but produces little peripheral vasoconstriction and therefore preserves renal blood flow

_______c. Lowers blood pressure by relaxing the smooth muscle of the vascular wall

_______d. Neutralizes the action of heparin; dosage is calculated according to amount of heparin given

_______e. Given to treat ventricular arrhythmias; controls PVCs and prevents development of ventricular fibrillation

_______f. Short-acting cardiac stimulant; increases force of heartbeat

_______g. Anticoagulant given to the patient prior to cardiopulmonary bypass to prevent clotting; may also be used to irrigate the lumen of blood vessels during anastomosis and to prime the pump-oxygenator

1. Calcium chloride
2. Dopamine
3. Epinephrine
4. Heparin sodium
5. Isoproterenol
6. Lidocaine
7. Nitroprusside
8. Protamine sulfate
9. Sodium bicarbonate

4. Distinguish between two common diagnostic procedures used in cardiovascular and peripheral vascular surgery by placing an "A" next to the description of arteriography and a "CC" next to the description of cardiac catheterization.

_______a. Involves the insertion of a radiopaque plastic catheter into the right or left side of the heart through a percutaneous puncture or cutdown to the brachial or femoral arteries; contrast media is injected through the catheter and cardiac angiography is performed to demonstrate anatomical structure and functional capabilities of the heart, as well as to determine oxygen saturation, pressure in the chambers, and cardiac output

_______b. Injection of radiopaque dye directly into an artery to obtain x-rays of the vessel and its tributaries in order to determine the exact location and extent of arterial disease or obstruction

Written Test

5. Complete the following statements concerning cardiovascular and peripheral vascular pathology by placing the correct word in the appropriate blanks.

   a. __________________ — Condition caused by progressive obstruction (occlusion) of the coronary arteries by atherosclerotic plaque which results in decreased blood flow to the myocardium

   b. __________________ — Narrowing of a heart valve which obstructs the passage of blood

   c. Peripheral vascular disease — Non-specific term indicating diseases of the __________________ of the extremities

   d. __________________ — Sac-like bulging or weakening in a vessel, usually an artery, resulting from arteriosclerosis, trauma, infection, hypertension, or congenital defect

   e. __________________ — Thickening and loss of elasticity of the walls of the arteries with inflammatory changes resulting from fibrous and mineral deposits in the middle layer of the artery wall

   f. __________________ — Condition in which the normal passage of electrical conduction between the atria and ventricles is interrupted so that they beat independently of each other

   g. __________________ — Collection of fatty and other substances on the inner lining of arteries, forming atheromatous plaques, which progressively occlude the passageways and obstruct the flow of blood

   h. __________________ — Condition which occurs when a valve loses its ability to close tightly resulting in the blood flowing back through the diseased valve into its originating chamber

   i. __________________ — Swollen, distended, and knotted veins visible especially in the legs

Written Test

6. Distinguish among types of aortic aneurysms by placing the following letters next to the correct descriptions:

C — Compound
D — Dissecting
F — False
S — Sacculated
T — True

______a. Wall of the dilated sac consists of one or more of the layers that make up the wall of the blood vessel

______b. All of the layers of the vessel are ruptured and the blood is retained by surrounding tissues

______c. Some of the layers of the vessel wall are ruptured and some are merely dilated

______d. Rupture of the inner layer has permitted blood to escape between layers of the vessel wall

______e. Involves a weak area on only one side, not the entire circumference

7. Match congenital anomalies of the cardiovascular system on the right with the correct descriptions.

______a. Communication between the aorta and pulmonary artery, normal during fetal development, which fails to close following birth

______b. Defect or hole in the interventricular septum allowing passage of blood from one ventricle to the other resulting in varying degrees of cyanosis; small defects are of little importance but larger defects must usually be repaired surgically

______c. Defect or hole in the interatrial septum of the heart which results in a left-to-right shunting of blood; may be well-tolerated early in life but eventually results in greatly increased workload for the right side of the heart

1. Atrial septal defect
2. Coarctation of the aorta
3. Patent ductus arteriosus
4. Tetralogy of Fallot
5. Transposition of great vessels
6. Ventricular septal defect

Written Test

______d. Constriction or narrowing of the lumen of the aortic arch

______e. Most common cyanotic congenital cardiac anomaly that combines the following structural defects: pulmonary stenosis, high ventricular septal defect, overriding aorta, and hypertrophy of the right ventricle

8. Complete the following statements concerning special considerations of cardiovascular surgery by filling in the blanks with the correct answers.

a. The ____________________ must be of sufficient size to contain all necessary specialized equipment for cardiovascular surgery.

b. A ____________________ supplied with appropriate medications, supplies, defibrillator and paddles, and cardiac monitor must be in the operating room at all times.

c. All preoperative diagnostic test results should be on the ____________________ in the operating room.

d. The patient awaiting surgery may exhibit a great deal of ____________________. The team members should prepare for this and respond in a therapeutic manner.

e. The patient is positioned on a ____________________ blanket on the OR table making sure all pressure points are well padded and the body is in alignment.

f. Pressure monitoring catheters, such as those measuring arterial and venous lines, are usually inserted ____________________ anesthesia induction and intubation. A left atrial pressure line is inserted after the chest is open.

g. An indwelling ____________________ is usually inserted to monitor renal function, especially during and after cardiopulmonary bypass.

h. Thermistor probes may be placed in the esophagus, nasopharynx and/or ____________________ to monitor body temperature during the procedure.

i. An adequate supply of blood for replacement must be available ____________________ the procedure.

Written Test

j. The draping procedure for most cardiovascular surgeries is quite extensive and will be dictated by the type of surgery and preference of the __________________.

k. Most cardiovascular procedures require a great number and variety of instruments, including basic laparotomy, __________________ instruments, and specialized cardiovascular instruments.

l. Since many different drugs may be present on the back table, it is extremely important to __________________ each one.

m. Multiple __________________ may be obtained during the procedure, particularly a coronary artery bypass graft. These must be kept separate on the back table and labeled as necessary.

9. List four specialized instruments for cardiovascular surgery.

   a. ____

   b. ____

   c. ____

   d. ____

10. Complete the following statements concerning cardiopulmonary bypass by filling in the blanks with the correct answers.

    a. Cardiopulmonary bypass is the method used to __________________ from the heart and lungs to allow the surgeon to perform surgery on the heart or great vessels.

    b. The basic equipment required includes the pump-oxygenator which collects the blood, filters and __________________ it, and returns it to the body.

    c. Method of action

       (1) Venous blood is drained to the pump-oxygenator through cannulas placed in the __________________ via small incisions in the right atrium.

       (2) The blood passes through the pump-oxygenator and heat exchanger, and the oxygenated blood is returned from the pump to systemic arterial circulation via the __________________ which has been placed in the ascending aorta.

Written Test

11. Match procedures requiring cardiopulmonary bypass listed on the right with the correct descriptions.

______a. Involves bypassing the occluded segment or segments of one or both coronary arteries using an autogenous vein or artery graft

______b. Heart valve (aortic, mitral, or tricuspid) is excised and replaced with a prosthetic valve

______c. Surgical correction of a defect or hole in the interatrial or interventricular septum closed with a primary closure or a prosthetic patch

______d. Removal of an aneurysm of the ascending aorta; resected portion of the aorta is replaced with a prosthetic graft

______e. Surgeon may choose to perform a closed palliative or open corrective procedure based on age, condition of the patient, and severity of pulmonary stenosis

(1) Closed palliative procedures are designed to divert poorly oxygenated blood from one of the major arteries back through one of the pulmonary arteries to the lungs for reoxygenation

(2) Open corrective procedures involve complete repair of the pulmonary valve stenosis and closure of the ventricular septal defect

1. Repair of an ascending aortic aneurysm
2. Repair of Tetrology of Fallot
3. Repair of transposition of the great vessels
4. Valve replacement
5. Closure of an atrial or ventricular septal defect
6. Coronary artery bypass graft

Written Test

12. Complete the following statements concerning procedures that do *not* require cardiopulmonary bypass by filling in the blanks with the correct answers.

    a. Closure of a patent ductus arteriosus — Closure of an abnormal communication between the __________________ and __________________ by suture ligation or division of the ductus

    b. Repair of __________________ of the aorta — Excision of a constricted segment of the aorta followed by an end-to-end anastomosis, with or without a graft, to reestablish continuity of the aorta

    c. Insertion of permanent pacemaker — Implantation of a __________________ and electrode to initiate atrial and/or ventricular contraction

    d. Insertion of __________________ — Implantation of pulse generator, myocardial patches, and sensing electrodes to deliver electronic shock to the heart

    e. __________________ — Method of treating coronary artery narrowing using a balloon-tipped catheter

13. Arrange in order the procedure for the insertion of transvenous electrodes and implantation of a permanent pacemaker by placing the correct sequence numbers (1-14) in the appropriate blanks.

    ______a. Surgeon inserts the electrode and advances it, under direct fluoroscopic vision, into the right atrium, through the tricuspid valve, and into the right ventricle.

    ______b. If local anesthesia is to be used, the surgeon infiltrates the skin and subcutaneous tissues with local anesthetic solution of his/her choice.

    __*8*__c. Surgeon attempts to lodge or entrap the electrode tip in the trabecula carnea of the right ventricular apex.

    ______d. Patient is prepped and draped.

    ______e. Surgeon encircles the vessel with heavy suture or umbilical tape.

    ______f. Surgeon places pulse generator in the pocket and irrigates the wound(s) with antibiotic solution.

    ______g. If the electrode has been placed through in the jugular vein, the surgeon creates a tunnel through the subcutaneous tissue to the pocket of the pacemaker and passes the electrode through the tunnel.

Written Test

__6__h. Surgeon performs a venotomy with a No. 11 blade or inserts an introducer into the vein.

______i. Surgeon closes the wound(s).

______j. Surgeon performs a cutdown to isolate a cephalic or jugular vein.

______k. Patient is placed in supine position, and EKG monitor leads are placed in position.

______l. Surgeon creates a pocket for the implantable pacemaker (pulse generator).

__9__m. The electrode is attached, by appropriate cables, to an external pulse generator or a pacing analyzer for testing.

______n. Surgeon attaches electrode to pulse generator.

14. Select true statements concerning special considerations of peripheral vascular surgery by placing a "T" next to the true statements and an "F" next to the false statements.

______a. Results of preoperative tests should be available in room before surgery.

______b. Arterial pressure lines and CVP monitoring may be performed depending on the type of surgery and the patient's physiological status.

______c. Indwelling urinary catheters are rarely used for procedures that involve clamping the aorta above the renal arteries.

______d. Since peripheral vascular procedures are very short, the use of a hyper/hypothermia unit is not necessary.

______e. Special attention must be given in positioning the patient undergoing peripheral vascular surgery, due to the patient's impaired circulation. Proper skeletal alignment as well as providing proper support and padding will prevent injury to patient.

______f. Considerable variations exist in draping the peripheral vascular patient depending on the type of procedure and surgeon preference.

______g. Filtering devices such as umbrellas and clips are used to stop the flow of blood during surgery.

Written Test

15. Match peripheral vascular operations on the right with the correct descriptions.

______a. Implantation of an artificial or autogenous graft into the femoral and popliteal arteries for treatment of arteriosclerotic disease of the femoral artery

______b. Removal of a blood clot from an artery using an embolectomy catheter in order to restore circulation to the part supplied by the artery

______c. Surgical removal of the saphenous vein and its branches to treat varicose veins of the leg(s) which relieves pain and prevents ulceration and/or bleeding

______d. Implantation of a synthetic bifurcated graft from the aorta to the iliac arteries to bypass sections occluded by atherosclerotic plaque

______e. Removal of arteriosclerotic plaque from an obstructed carotid artery in order to restore circulation

______f. Removal of an abdominal aortic aneurysm and the insertion of a synthetic prosthesis to restore continuity

1. Abdominal aortic aneurysmectomy with graft
2. Aorta-femoral bypass
3. Aorta-iliac bypass
4. Arterial embolectomy
5. Arteriovenous shunt
6. Carotid endarterectomy
7. Femoral-popliteal bypass
8. High ligation of saphenous veins with or without excision
9. Vein stripping

16. Complete the following statements concerning the procedure for an abdominal aortic aneurysmectomy with graft implantation by placing the correct answers in the blanks provided.

______a. What area(s) need(s) to be prepped?

(1) Abdomen only
(2) Abdomen, groin, and both anterior legs to the knees
(3) Abdomen, groin, and both anterior legs to the toes
(4) Abdomen, groin, and only the anterior leg that will donate graft

Written Test

______b. Incision is made from __________________

(1) Xiphoid process to umbilicus
(2) Xiphoid process to symphysis pubes
(3) Umbilicus to symphysis pubes

______c. A __________________ syringe with a __________________ needle is used to obtain blood from the aorta above the aneurysm for preclotting the graft

(1) 15 cc, 26 gauge
(2) 30 cc, 26 gauge
(3) 15 cc, 18 gauge
(4) 30 cc, 18 gauge

______d. Anesthesiologist gives __________________ intravenously prior to the clamping of the iliac arteries

(1) Epinephrine
(2) Lidocaine
(3) Heparin sodium
(4) Protamine sulfate

______e. Which wall of an aortic aneurysm is excised?

(1) Anterior
(2) Posterior

______f. The graft is anastomosed to the aorta using __________________ vascular suture.

(1) Absorbable
(2) Nonabsorbable

17. Arrange in order the procedure for an arterial embolectomy by placing the correct sequence numbers (1-12) in the appropriate blanks.

______a. Surgeon usually flushes the artery by injecting heparinized saline through an irrigating Fogarty catheter.

______b. Surgeon incises artery with a No. 11 blade on a No. 7 knife handle.

______c. Technologist attaches a proper size saline-filled syringe to the Fogarty catheter and inflates balloon to check for patency.

Written Test

______d. Surgeon may irrigate wound with antibiotic solution.

______e. As backflow of blood is obtained, the surgeon applies a peripheral vascular clamp below the arteriotomy.

__5__f. Surgeon inserts Fogarty catheter into artery beyond the point of clot attachment.

______g. If satisfied with backflow, the surgeon closes the artery with a small vascular double-armed suture.

______h. Surgeon incises skin and subcutaneous tissue over the affected artery and controls bleeding.

______i. Surgeon exposes artery and applies moistened umbilical tapes and angled peripheral vascular clamps.

______j. Surgeon gently inflates balloon and slowly withdraws the catheter. The clot is removed from catheter.

______k. Surgeon closes wound.

__9__l. Surgeon checks backflow of blood.

18. Complete the following statements concerning the procedure for a carotid endarterectomy by placing the correct answers in the blanks provided.

______a. Areas to be prepped include:

(1) Ear to shoulder and right or left arm
(2) Ear to abdomen (umbilicus) and right or left leg
(3) Ear to axilla and right or left leg
(4) Axilla to abdomen and right or left arm

______b. Surgeon makes vertical incision along the anterior border of the

(1) Sternocleidomastoid
(2) Deltoid
(3) Temporalis
(4) Pectoralis major

Written Test

______c. Plaque is removed from the following blood vessels during this procedure:

(1) Thyroid arteries
(2) Carotid arteries
(3) Carotid veins
(4) Vagus arteries

______d. After removing plaque, surgeon irrigates artery with:

(1) Normal saline
(2) Sterile water
(3) Heparized saline
(4) Thrombin

*Permission to duplicate this test is granted.

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Unit Evaluation Form

Student Name ______________________________ Unit Rating __________

Assignment Sheet 1—Determine Needs for Given
Cardiovascular and Peripheral Vascular Surgery Cases Rating _____

Comments: ____

____

Written Test Scores

Pretest _____ Posttest _____ Other _____

Other ____

____

Teacher Signature ______________________________ Date __________

Student Signature ______________________________ Date __________

***Permission to duplicate this form is granted.**

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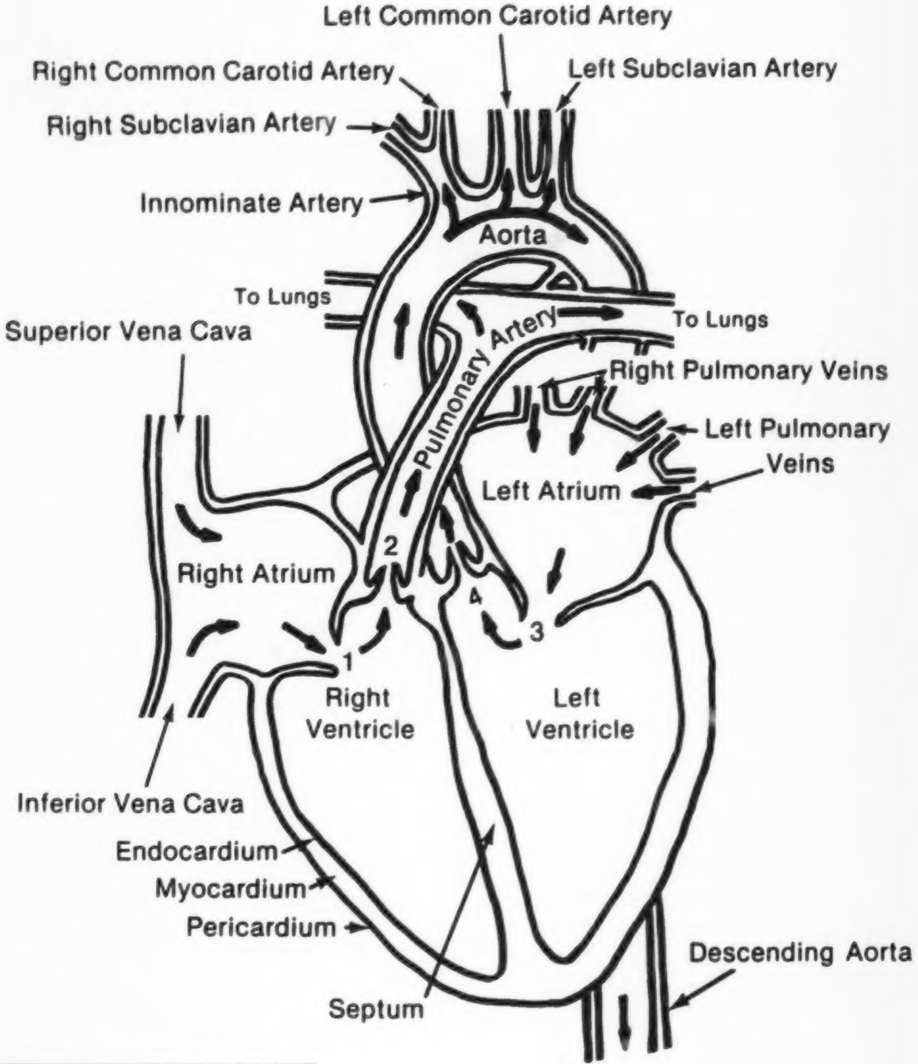
Structure of the Heart

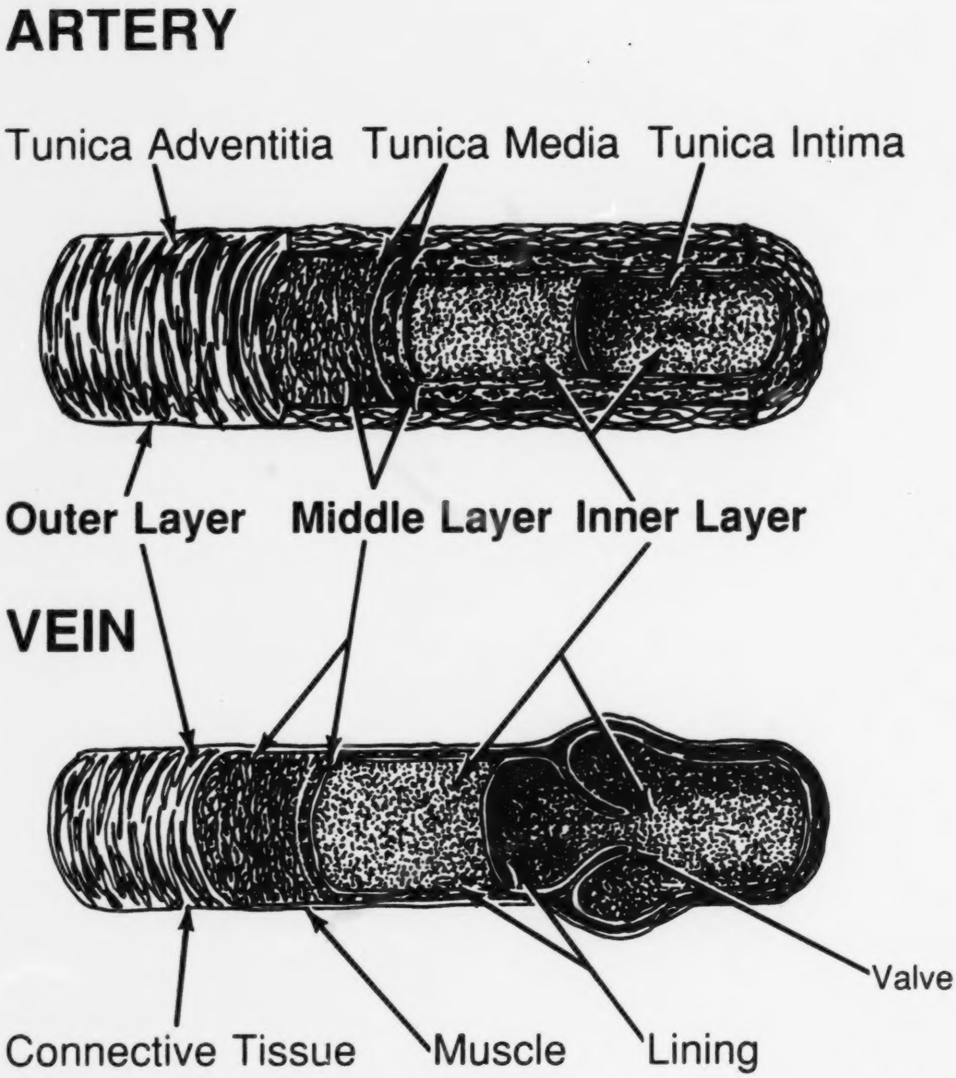

Left Common Carotid Artery
Right Common Carotid Artery
Left Subclavian Artery
Right Subclavian Artery
Innominate Artery
Aorta
To Lungs
Superior Vena Cava
To Lungs
Pulmonary Artery
Right Pulmonary Veins
Left Pulmonary Veins
Left Atrium
Right Atrium
2
4
3
1
Right Ventricle
Left Ventricle
Inferior Vena Cava
Endocardium
Myocardium
Pericardium
Descending Aorta
Septum

VALVES

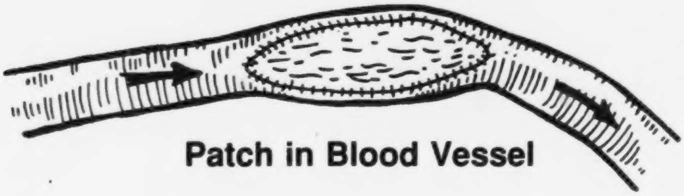
1. Tricuspid
2. Pulmonary Semilunar
3. Bicuspid or Mitral
4. Aortic Semilunar

818

Layers of Blood Vessels

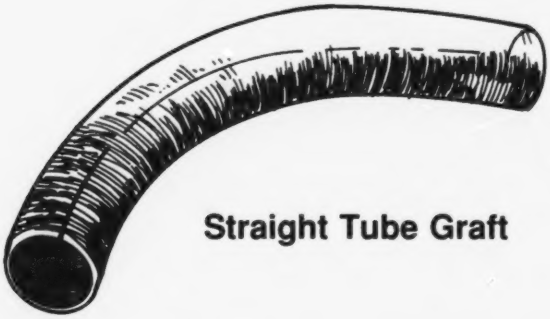

ARTERY
Tunica Adventitia
Tunica Media
Tunica Intima
Outer Layer
Middle Layer
Inner Layer
VEIN
Valve
Connective Tissue
Muscle
Lining

Cardiovascular Supplies
—Prosthetic Patches and Grafts—

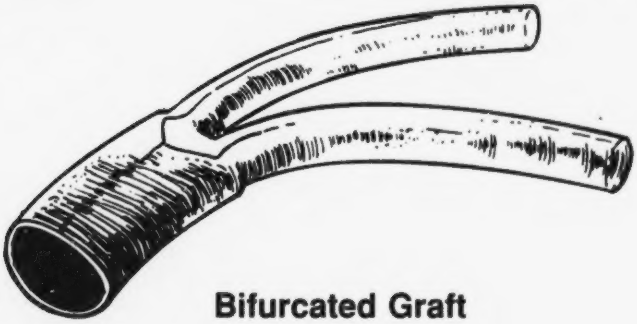


Patch in Blood Vessel

Prosthetic Patch for Vessels



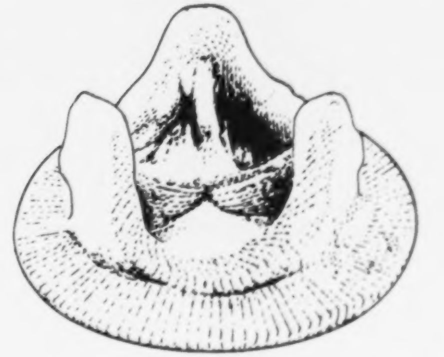
Straight Tube Graft



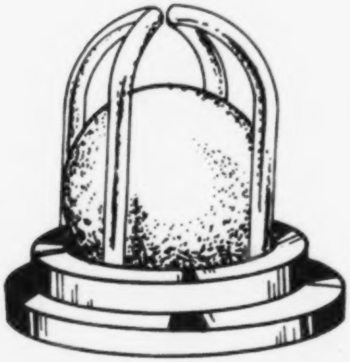
Bifurcated Graft

Prosthetic Grafts for Vessels

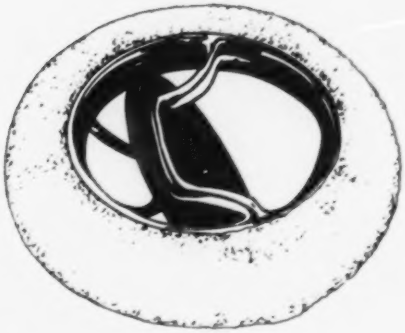
Cardiovascular Supplies
—Prosthetic Heart Valves—



Porcine

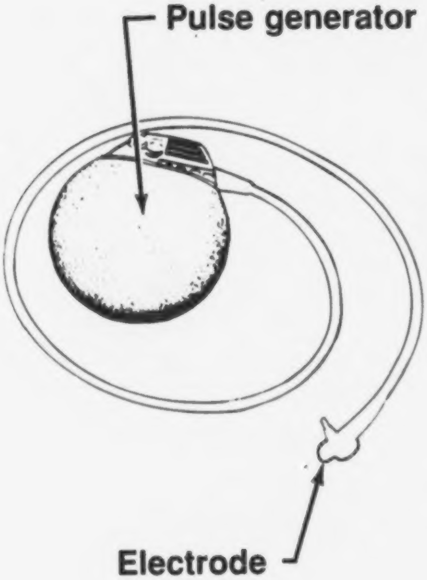


Ball and Cage
(Mechanical)

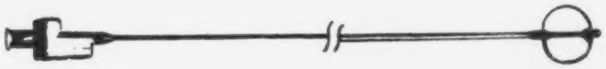


Tilting Disk
(Mechanical)

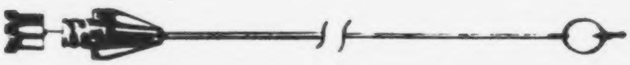
Cardiovascular Supplies
(Continued)


Pulse generator
Electrode

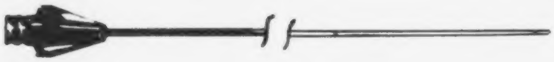
Internal Artificial Pacemaker



Arterial Embolectomy



Venous Thrombectomy



Irrigation

Fogarty Catheters

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Information Sheet

1. **Terms and definitions**

   a. **Arrhythmia** — Irregularity or loss of rhythm of the heartbeat

   b. **Atheromatous** — Pertaining to the fatty degeneration or thickening of the walls of the larger arteries occurring in atherosclerosis

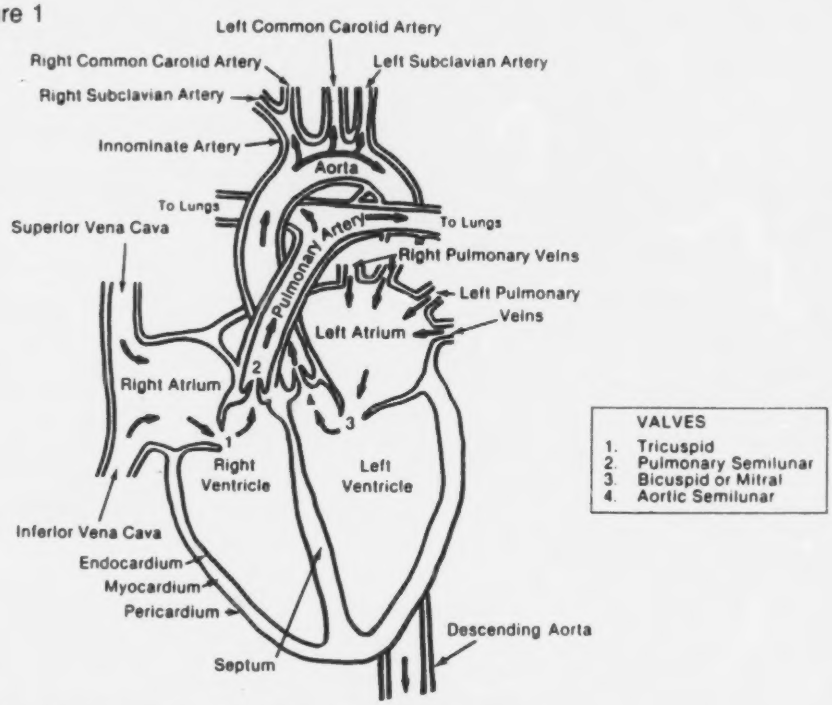
   c. **Autogenous** — Originating within the body

   d. **Bifurcation** — Separation into two branches; the point of forking

   e. **Cannula** — Tube or sheath allowing the escape of fluid

   f. **Cardiopulmonary** — Pertaining to the heart and lungs

   Figure 1


Left Common Carotid Artery
Right Common Carotid Artery
Left Subclavian Artery
Right Subclavian Artery
Innominate Artery
Aorta
To Lungs
To Lungs
Superior Vena Cava
Pulmonary Artery
Right Pulmonary Veins
Left Pulmonary Veins
Left Atrium
Right Atrium
2
4
3
1
Right Ventricle
Left Ventricle
Inferior Vena Cava
Endocardium
Myocardium
Pericardium
Septum
Descending Aorta
VALVES
1. Tricuspid
2. Pulmonary Semilunar
3. Bicuspid or Mitral
4. Aortic Semilunar

   g. **Cinematoradiogram** — X-rays of an organ in motion

   h. **Cyanosis** — Slightly blue-gray discoloration of the skin due to reduced amounts of hemoglobin in the blood

Information Sheet

i. **Defibrillation** — Stopping fibrillation of the heart through the use of drugs or by physical or electrical means

j. **Embolus** — Mass of undissolved matter present in or traveling through a blood vessel, usually an artery

k. **Endocardial** — Within the heart or arising from the inner lining of the heart

l. **Extracorporeal** — Outside of the body

m. **Fibrillation** — Rapid, tremulous, ineffectual contractions of the heart

n. **Lumen** — Space within an artery, vein, or tube

o. **Metabolic acidosis** — Excessive acidity of body fluids resulting from an increase in acids other than carbonic acid

p. **Myocardial** — Pertaining to the heart muscle

q. **Occlusion** — Abnormal closure of a passageway such as a blood vessel

r. **Palliative** — Serving to relieve or alleviate, without curing

s. **Plaque** — Patch of atherosclerosis consisting of cholesterol, lipids, and cellular debris that forms in the inner layers of the walls of arteries

t. **Premature ventricular contraction (PVC)** — Cardiac arrhythmia characterized by a ventricular beat preceding the expected electrical impulse; may be a precursor of ventricular tachycardia or fibrillation

u. **Septum** — Wall dividing two cavities, such as the chambers of the heart

v. **Stenosis** — Constriction or narrowing of a passageway

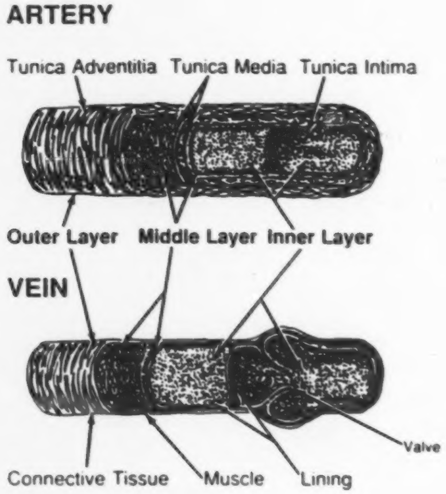
w. **Thrombosis** — Formation, development, or existence of a blood clot (thrombus) within the vascular system

x. **Thrombus** — Blood clot that obstructs a blood vessel or a cavity of the heart

y. **Trabecula carneae** — Thick, muscular tissue bands attached to inner walls of the ventricles of the heart

z. **Transient ischemic attack (TIA)** — Temporary interference with blood supply to the brain; neurologic deficit symptoms last for only a few minutes to several hours (less than 24 hours) aa. **Tunica intima** — Inner lining of a blood vessel

Figure 2—Layers of blood vessels


ARTERY
Tunica Adventitia
Tunica Media
Tunica Intima
Outer Layer
Middle Layer
Inner Layer
VEIN
Valve
Connective Tissue
Muscle
Lining

bb. **Vasoconstriction** — Narrowing of the caliber of blood vessels

2. **Special supplies and equipment used in cardiovascular and peripheral vascular surgery**

a. Defibrillator and paddles — Electrical device that discharges an electric countershock to the heart in order to correct an abnormal heart rhythm or to start a heart rhythm

Note: Both sterile internal paddles and nonsterile external paddles should be available in the operating room.

b. Electrocardiograph — Used for recording electrical variations in action of heart muscles

(1) Used for routine physical exams, when a heart disorder occurs or is suspected, and to monitor the heart's activity during most surgical procedures

(2) Helps diagnose damage occurring to the heart by a coronary occlusion, abnormal rhythms, and the effects of certain cardiac drugs

c. Hyper/hypothermia unit

  (1) Hypothermia — Used to reduce the body temperature and lengthen the period of circulatory interruption which lessens the danger of neurological or other organ damage

  (2) Hyperthermia — Used to increase body temperature following the use of hypothermia, or to maintain adequate temperature during lengthy peripheral vascular procedures

d. Underwater chest drainage systems — Used following cardiac procedures to drain air, fluid, or a combination from the patient's chest; consists of chest tubes and disposable unit or 1, 2, or 3 bottles for drainage, seal, and suction

Note: The use of underwater chest drainage systems is discussed more fully in Unit 12, "Thoracic Surgery."

e. Intra-aortic balloon pump (IABP)

  (1) Used as adjunct treatment for patients with acute left ventricular failure

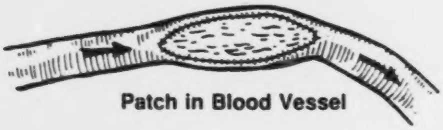
  (2) Consists of an inflatable balloon placed in the descending aorta through a femoral artery; balloon is attached by a connecting line to a pumping unit that uses helium or carbon dioxide as the inflating gas

  (3) Operates on the principle of "counter pulsation" — Balloon inflates during ventricular diastole augmenting coronary blood flow, and deflates during systole which reduces work load on the left ventricle

f. Prosthetic patches and grafts

  (1) Patches — Teflon or Dacron materials available in a variety of forms used to strengthen a suture line or to cover or reinforce a defect

Figure 3—Example of a patch

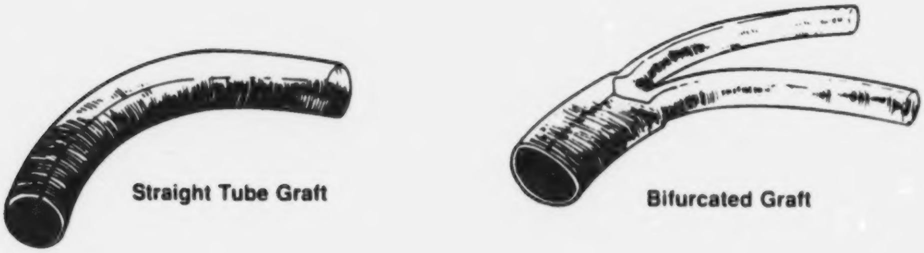


Information Sheet

(2) Grafts — Teflon or Dacron materials available in a variety of types and sizes used to replace a segment of an artery that has been surgically resected because of an abnormality; two most common types are knitted and woven and both are available in straight or bifurcated forms

Note: Some grafts require preclotting before the anastomosis.

Figure 4—Examples of grafts



Straight Tube Graft

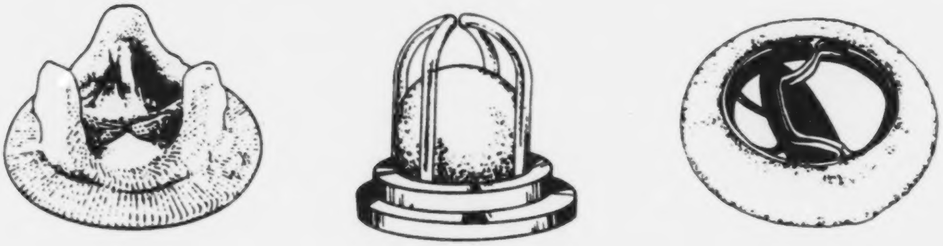
Bifurcated Graft

g. Prosthetic heart valves

(1) Implants designed to replace defective heart valves

(2) May be heterograft (porcine), homograft (cadaver), or artificial (mechanical)

Figure 5—Examples of prosthetic heart valves



Porcine

Ball and Cage (Mechanical)

Tilting Disk (Mechanical)

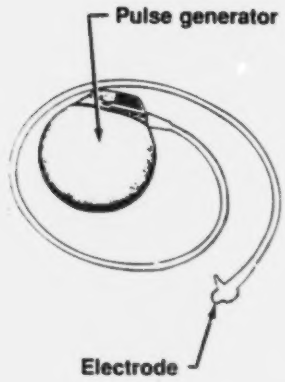
Information Sheet

h. Internal (permanent) artificial pacemaker — Electrical device that substitutes for a defective natural pacemaker to stimulate the heart muscle to beat at a regular pace to correct bradycardia or to control arrhythmias; may be fixed rate or demand type

  (1) Pulse generator — Battery-powered device used to initiate atrial or ventricular contractions

  (2) Electrodes — Insulated lead wires connecting the heart muscle with the pulse generator to deliver the impulse

Figure 6—Example of internal artificial pacemaker



i. Internal defibrillator (implanted cardioverter) — Electrical implant device used to administer electrical shocks to the heart during ventricular fibrillation or ventricular tachycardia; consists of generator, myocardial patches, and sensing electrodes

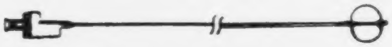
j. Shunts — Artificial (synthetic) tubes used to divert blood flow from one main route to another or around an obstruction

Information Sheet

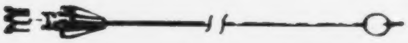
k. Fogarty catheters

(1) Arterial embolectomy and venous thrombectomy Fogarty catheters — Tubes with a small inflatable balloon in the end that are passed through a vessel to remove thromboembolic material

Figure 7—Fogarty catheters—Arterial and venous



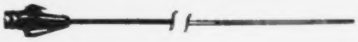
Arterial Embolectomy



Venous Thrombectomy

(2) Irrigating Fogarty catheters — Tubes with multiple eyes used to flush an artery by injecting heparinized saline solution to prevent further clot formation

Figure 8—Irrigating Fogarty catheter



3. Drugs commonly used in cardiovascular and peripheral vascular surgery

a. Heparin sodium

(1) An anticoagulant

(2) Given to the patient prior to cardiopulmonary bypass to prevent clotting

(3) May also be used to irrigate the lumen of blood vessels during anastomosis and to prime the pump-oxygenator

(4) Dosage is calculated according to patient's weight in kilograms.

b. Protamine sulfate

(1) Neutralizes the action of heparin

(2) Dosage is calculated according to amount of heparin given.

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c. Lidocaine (Xylocaine®) 1%

   (1) Given to treat ventricular arrhythmias

   (2) Controls PVCs and prevents development of ventricular fibrillation

d. Epinephrine (Adrenalin) — Short-acting cardiac stimulant; increases force of heartbeat

e. Calcium chloride — Increases cardiac muscle and tone; opposes the effect of potassium

f. Sodium bicarbonate — Buffer used to prevent or correct metabolic acidosis

g. Dopamine (Intropin®) — Increases cardiac output but produces little peripheral vasoconstriction and therefore preserves renal blood flow

h. Isoproterenol (Isuprel®) — Accelerates the heart rate and lowers pulmonary vascular resistance

i. Nitroprusside (Nipride®) — Lowers blood pressure by relaxing the smooth muscle of the vascular wall

4. Common diagnostic procedures used in cardiovascular and peripheral vascular surgery

a. **Cardiac catheterization** — Involves the insertion of a radiopaque plastic catheter into the right or left side of the heart through a percutaneous puncture or cutdown to the brachial or femoral arteries

   (1) Contrast media is injected through the catheter and cardiac angiography is performed to demonstrate anatomical structure and functional capabilities of the heart.

   (2) Determination of oxygen saturation, pressure in the chambers, and cardiac output is also performed through cardiac catheterization.

   Note: Cardiac catheterization is usually performed in a special cardiac catheterization laboratory which is equipped with all necessary x-ray and monitoring equipment.

b. **Arteriography** — Injection of radiopaque dye directly into an artery to obtain x-rays of the vessel and its tributaries in order to determine the exact location and extent of arterial disease or obstruction

   Note: CT and MRI scans may also be taken prior to some procedures. These are usually performed in another department.

Information Sheet

5. Cardiovascular and peripheral vascular pathology

a. **Aneurysm** — Sac-like bulging or weakening in a vessel, usually an artery, resulting from arteriosclerosis, trauma, infection, hypertension, or congenital defect in the vessel

b. **Arteriosclerosis** — Thickening and loss of elasticity of the walls of the arteries with inflammatory changes resulting from fibrous and mineral deposits in the middle layer of the artery wall

c. **Atherosclerosis** — Collection of fatty and other substances on the inner lining of arteries, forming atheromatous plaques, which progressively occlude the passageways and obstruct the flow of blood

d. **Coronary artery disease** — Condition caused by progressive obstruction (occlusion) of the coronary arteries by atherosclerotic plaque which results in decreased blood flow to the myocardium; the plaque may:

   (1) Obstruct blood flow causing chest pain or a feeling of tightness (angina pectoris)

   (2) Break free from the artery wall and be carried through the bloodstream until it lodges and blocks flow elsewhere

   (3) Act as a site for formation of a blood clot which can cause a coronary thrombosis (heart attack)

e. **Heart block** — Condition in which the normal passage of electrical conduction between the atria and ventricles is interrupted so that they beat independently of each other

f. **Peripheral vascular disease** — Non-specific term indicating diseases of the arteries and veins of the extremities, especially those which interfere with adequate blood flow to or from the extremities, such as arteriosclerosis and varicose veins

g. **Valvular insufficiency** — Condition which occurs when a valve loses its ability to close tightly resulting in the blood flowing back through the diseased valve into its originating chamber

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h. **Valvular stenosis** — Narrowing of a heart valve which obstructs the passage of blood

  (1) Mitral stenosis — Narrowing of the mitral or bicuspid valve which obstructs the passage of blood fro the left atrium to the left ventricle

  (2) Aortic stenosis — Narrowing of the aortic semilunar valve which obstructs the passage of blood from the left ventricle to the aorta

i. **Varicose veins** — Swollen, distended, and knotted veins visible especially in the legs

6. Types of aortic aneurysms

a. **True aneurysm** — Wall of the dilated sac consists of one or more of the layers that make up the wall of the blood vessel

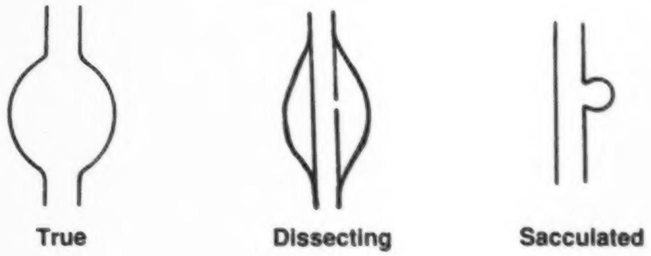
b. **False aneurysm** — All of the layers of the vessel are ruptured and the blood is retained by surrounding tissues

c. **Compound aneurysm** — Some of the layers of the vessel wall are ruptured and some are merely dilated

d. **Dissecting aneurysm** — Rupture of the inner layer (tunica intima) has permitted blood to escape between layers of the vessel wall

e. **Sacculated aneurysm** — Involves a weak area on only one side, not the entire circumference

Figure 9—Examples of aneurysms



Information Sheet

7. **Congenital anomalies of the heart**

   a. **Atrial septal defect** (ASD)

      (1) Is a defect or hole in the interatrial septum of the heart which results in a left-to-right shunting of blood

      (2) May be well-tolerated early in life but eventually results in greatly increased workload for the right side of the heart

   b. **Coarctation of the aorta** — Constriction or narrowing of the lumen of the aortic arch

   c. **Patent ductus arteriosus** — Communication between the aorta and pulmonary artery, normal during fetal development, which fails to close following birth

   d. **Tetralogy of Fallot** — Most common cyanotic congenital cardiac anomaly that combines the following structural defects:

      (1) Pulmonary stenosis

      (2) High ventricular septal defect

      (3) Overriding aorta

      (4) Hypertrophy of the right ventricle

   e. **Transposition of the great vessels** — Aorta arises from the right ventricle and the pulmonary artery from the left ventricle which results in reversed circulations

   f. **Ventricular septal defect** (VSD)

      (1) Is a defect or hole in the interventricular septum allowing passage of blood from one ventricle to the other resulting in varying degrees of cyanosis

      (2) Small defects are of little importance but larger defects must usually be repaired surgically.

8. **Special considerations of cardiovascular procedures**

   a. The operating room must be of sufficient size to contain all necessary specialized equipment for cardiovascular surgery.

   b. A crash cart supplied with appropriate medications, supplies, defibrillator and paddles, and cardiac monitor must be in the operating room at all times.

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c. All preoperative diagnostic test results should be on the chart in the operating room.

d. The patient awaiting surgery may exhibit a great deal of anxiety. The team members should prepare for this and respond in a therapeutic manner.

e. The patient is positioned on a hyper/hypothermia blanket on the OR table making sure all pressure points are well padded and the body is in alignment.

f. Pressure monitoring catheters, such as those measuring arterial and venous lines, are usually inserted following anesthesia induction and intubation. A left atrial pressure line is inserted after the chest is open.

g. An indwelling urinary catheter is usually inserted to monitor renal function, especially during and after cardiopulmonary bypass.

h. Thermistor probes may be placed in the esophagus, nasopharynx and/or rectum to monitor body temperature during the procedure.

i. An adequate supply of blood for replacement must be available during the procedure.

j. The draping procedure for most cardiovascular surgeries is quite extensive and will be dictated by the type of surgery and preference of the surgeon.

Note: Many drape sheets may be used. An adequate supply should be available prior to the start of the procedure.

k. Most cardiovascular procedures require a great number and variety of instruments, including basic laparotomy instruments, thoracic instruments, and specialized cardiovascular instruments.

l. Since many different drugs may be present on the back table, it is extremely important to label each one.

m. Multiple specimens may be obtained during the procedure, particularly a coronary artery bypass graft. These must be kept separate on the back table and labeled as necessary.

Information Sheet

9. Specialized instruments for cardiovascular surgery

Note: Many other instruments could be added to this list. Complete setup will also include general and thoracic instruments.

a. Cardiovascular scissors (Potts-Smith, DeBakey-Potts)

b. Vena cava clamps (Satinsky, Derra)

c. Coarctation clamps (Crafoord, Cooley)

d. Aorta clamps (Johns Hopkins, DeBakey, Kay)

e. Bulldog clamps (Johns Hopkins, Glover, DeBakey)

f. Patent ductus clamps (Glover, Cooley)

g. Needle holders (DeBakey, Cooley)

10. Cardiopulmonary bypass (Extracorporeal circulation)

a. Cardiopulmonary bypass is the method used to temporarily divert blood flow from the heart and lungs to allow the surgeon to perform surgery on the heart or great vessels.

b. The basic equipment required includes the pump-oxygenator (heart-lung pump) which collects the blood, filters and oxygenates it, and returns it to the body.

c. Method of action

(1) Venous blood is drained to the pump-oxygenator through cannulas placed in the inferior and superior vena cavae via small incisions in the right atrium.

(2) The blood passes through the pump-oxygenator and heat exchanger.

(3) The oxygenated blood is returned from the pump to systemic arterial circulation via the arterial cannula which has been placed in the ascending aorta.

Note: In some cases the femoral artery and vein are used for placement of cannulas rather than the vena cavae and aorta.

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11. Procedures requiring cardiopulmonary bypass

Note: All of the following procedures are performed through a median sternotomy incision. Chest tubes are inserted prior to closing the wound.

a. **Coronary artery bypass graft**

(1) Involves bypassing the occluded segment or segments of one or both coronary arteries an autogenous vein or artery graft

(2) The bypass is accomplished by anastomosing the graft at the upper end to the ascending aorta and at the lower end to a point on the coronary artery past the occlusion. Oxygenated blood bypasses the obstruction to supply adequate oxygen to the heart muscle.

b. **Valve replacement**

(1) Performed to treat valvular insufficiency

(2) The heart valve is excised and replaced with a prosthetic valve.

(3) The aortic, mitral, or tricuspid valve may be replaced.

c. **Closure of an atrial or ventricular septal defect**

(1) Is the surgical correction of a defect or hole in the interatrial or interventricular septum

(2) The small defect may be closed with a primary closure (edges are sewn together directly) or a prosthetic patch may be needed to close a larger hole.

(3) Is usually performed on the pediatric patient; however, symptoms of the atrial septal defect may not appear until adulthood

d. **Repair of an ascending aortic aneurysm**

(1) Is the removal of an aneurysm of the ascending aorta

(2) The resected portion of the aorta is replaced with a prosthetic graft.

Information Sheet

e. **Repair of Tetralogy of Fallot** — Surgeon may choose to perform a closed palliative or open corrective procedure based on age, condition of the patient, and severity of pulmonary stenosis

   (1) Closed palliative procedures (shunt for palliation) — Designed to divert poorly oxygenated blood from one of the major arteries back through one of the pulmonary arteries to the lungs for reoxygenation

      (a) Blalock-Taussig — End-to-side anastomosis between the proximal end of the subclavian and pulmonary artery on the side opposite the aortic arch

      (b) Potts-Smith — Side-to-side anastomosis directly between the aorta and left pulmonary artery

      (c) Waterston — Anastomosis of ascending aorta to the right pulmonary artery

      (d) Glenn — Anastomosis of the superior vena cava to the right pulmonary artery

   (2) Open corrective procedure — Involves complete repair of the pulmonary valve stenosis and closure of the ventricular septal defect

f. **Repair of transposition of the great vessels**

   (1) Palliative — May be performed to improve intracardiac mixing thereby increasing oxygenation of systemic blood; performed to sustain life until the infant has grown enough to tolerate a long corrective procedure

      (a) Rashkind atrial septostomy — Creation of an atrial septal defect to allow mixing of blood

      Note: This may be performed in the cardiac catheterization lab.

      (b) Blalock-Hanlon procedure — Creation of an opening between the right and left atria at the interatrial groove

      Note: No cardiopulmonary bypass is required for this procedure.

   (2) Corrective Mustard procedure — Remaining segments of the atrial septum are excised and a pericardial or synthetic patch is placed in atrial cavities in such a manner so that venous inflow is reversed

Information Sheet

12. Procedures that do not require cardiopulmonary bypass

a. **Closure of a patent ductus arteriosus** — Closure of an abnormal communication between the aorta and pulmonary artery by suture ligation or division of the ductus

b. **Repair of coarctation of the aorta** — Excision of a constricted segment-of the aorta followed by an end-to-end anastomosis, with or without a graft, to reestablish continuity of the aorta

c. **Insertion of permanent pacemaker** — Implantation of a pulse generator and electrode to initiate atrial and/or ventricular contraction

    (1) Myocardial electrodes are generally placed into the muscle of the heart through a thoracotomy approach.

    (2) Endocardial electrodes are generally advanced through the jugular or cephalic vein, into the right atrium, through the tricuspid valve, and into the right ventricle where the tip is entrapped in the right ventricular apex.

    (3) Pulse generator/battery is placed in a pocket in the chest wall.

d. **Insertion of internal defibrillator** — Implantation of pulse generator, myocardial patches, and sensing electrodes to deliver electrical shock (defibrillation) to the heart in case of ventricular fibrillation or ventricular tachycardia

    (1) Electrodes are placed in right ventricle.

    (2) Patches are sutured to the epicardium.

    (3) Pulse generator/battery is placed in a pocket of the abdominal wall.

e. **Angioplasty or percutaneous transluminal coronary angioplasty (PTCA)** — Method of treating coronary artery narrowing in which a balloon-tipped catheter is threaded into the artery through an incision in the femoral or brachial arteries; when balloon is inflated, it forces the plaque against the wall thereby enlarging the lumen

    Note: This procedure may be performed in some cardiac catheterization labs. Laser therapy may also be used to destroy plaque.

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13. Procedure for the insertion of transvenous electrodes and implantation of a permanent pacemaker

a. Patient is placed in supine position, and EKG monitor leads are placed in position.

Note: The placement of EKG leads is vital to monitor the patient's condition during this procedure.

b. Patient is prepped and draped.

c. If local anesthesia is to be used, the surgeon infiltrates the skin and subcutaneous tissues with local anesthetic solution of his/her choice.

d. Surgeon performs a cutdown to isolate a cephalic or jugular vein.

e. Surgeon encircles the vessel with heavy suture or umbilical tape.

f. Surgeon performs a venotomy with a No. 11 blade or inserts an introducer into the vein.

g. Surgeon inserts the electrode and advances it, under direct fluoroscopic vision, into the right atrium, through the tricuspid valve, and into the right ventricle.

h. Surgeon attempts to lodge or entrap the electrode tip in the trabecula carnea of the right ventricular apex.

i. The electrode is attached, by appropriate cables, to an external pulse generator or a pacing analyzer for testing.

j. Surgeon creates a pocket for the implantable pacemaker (pulse generator).

k. If the electrode has been placed through in the jugular vein, the surgeon creates a tunnel through the subcutaneous tissue to the pocket of the pacemaker and passes the electrode through the tunnel.

l. Surgeon attaches electrode to pulse generator.

m. Surgeon places pulse generator in the pocket and irrigates the wound(s) with antibiotic solution.

n. Surgeon closes the wound(s).

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14. Special considerations of peripheral vascular surgery

a. Results of preoperative tests should be available in room before surgery.

b. Arterial pressure lines and CVP monitoring may be performed depending on the type of surgery and the patient's physiological status.

c. Indwelling urinary catheters are commonly used especially for procedures that will be lengthy, that involve the renal arteries or clamping the aorta above the renal arteries, or if a large amount of blood loss is expected.

Note: Frequent monitoring of urine output by the circulator or anesthesiologist is vital to assess renal function.

d. Since peripheral vascular procedures are very lengthy, the use of a hyper/hypothermia unit is recommended to maintain adequate body temperature.

e. Special attention must be given in positioning the patient undergoing peripheral vascular surgery, due to the patient's impaired circulation. Proper skeletal alignment as well as providing proper support and padding will prevent injury to patient.

f. Considerable variations exist in draping the peripheral vascular patient depending on the type of procedure and surgeon preference.

g. Many instruments are used in peripheral vascular surgery.

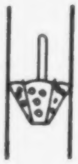
(1) Several instruments used in cardiovascular are also used in peripheral vascular.

(2) Since most vascular clamps are designed to partially or totally occlude blood flow, they must be maintained in good working order to prevent damage to the vessel and retain their special holding qualities.

h. Several filtering devices are available for use in peripheral vascular surgery.

(1) Umbrella-shaped filtering device (Mobin-Uddin, Greenfield) — Introduced into the vena cava to filter large emboli without stopping the flow of blood

Figure 10—Umbrella filter



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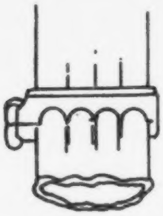
(2) Vena cava clip (DeWeis) — Placed around vena cava and clamped down with teeth pressing into the vein to act as filters and prevent large emboli from passing through

Figure 11—Vena cava clip



15. **Peripheral vascular procedures**

a. **Abdominal aortic aneurysmectomy with graft** — Removal of an abdominal aortic aneurysm and the insertion of a synthetic prosthesis to restore continuity

b. **Aorta-femoral bypass** — Implantation of a synthetic bifurcated graft from the aorta to the femoral arteries to bypass sections occluded by atherosclerotic plaque

c. **Aorta-iliac bypass** — Implantation of a synthetic bifurcated graft from the aorta to the iliac arteries to bypass sections occluded by atherosclerotic plaque

d. **Arterial embolectomy** — Removal of a blood clot from an artery using an embolectomy catheter (Fogarty) in order to restore circulation to the part supplied by the artery

e. **Arteriovenous shunt** — Insertion into the arm of a shunting device to facilitate hemodialysis on patients in chronic renal failure

f. **Carotid endarterectomy** — Removal of arteriosclerotic plaque from an obstructed carotid artery in order to restore circulation to brain and to treat some neurological problems such as transient ischemic attacks or suspected impending stroke

g. **Femoral-popliteal bypass** — Implantation of an artificial or autogenous graft into the femoral and popliteal arteries for treatment of arteriosclerotic disease of the femoral artery

h. **High ligation of saphenous veins with or without excision** — Ligation and division of the saphenous trunk with or without subsequent vein stripping

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i. **Vein stripping** — Surgical removal of the saphenous vein and its branches to treat varicose veins of the leg(s) which relieves pain and prevents ulceration and/or bleeding

16. Procedure for an abdominal aortic aneurysmectomy with graft implantation

a. Patient's abdomen, groin, and both anterior legs to the knees are prepped and draped to provide adequate exposure.

b. Surgeon makes midline incision from xiphoid process to symphysis pubis and controls bleeding.

c. Surgeon enters peritoneal cavity as in a routine laparotomy procedure.

d. Surgeon isolates abdominal viscera by covering with a sterile wet towel, lap packs, or intestinal bag.

e. Surgeon incises retroperitoneum over aorta and extends incision superiorly to expose the aneurysm and inferiorly to expose the iliac arteries.

f. Surgeon locates and identifies the extent of the aneurysm to determine if it involves the aortic bifurcation and iliac arteries.

Note: If the surgeon determines that the aneurysm involves the iliac arteries, he/she may decide to anastomose the graft to the femoral arteries rather than the iliac arteries. This will necessitate making two additional incisions over the groin area.

g. Surgeon performs blunt and sharp dissection to expose the aorta.

h. Surgeon applies moist umbilical tapes loosely above the aneurysm, being careful not to damage the renal arteries, veins, or ureters. A rubber shod hemostat is clamped on tip ends of tape.

i. Surgeon applies moist umbilical tapes around the iliac arteries and clamps tip of tapes with rubber shod hemostat.

j. Surgeon inspects aorta above the aneurysm to determine the appropriate size graft to be used which is then obtained by the circulator.

Note: A bifurcated graft in the appropriate size will be used if the aortic bifurcation is involved in the aneurysm. If the aneurysm does not involve the bifurcation, a straight tubular graft in the appropriate size is used.

k. Technologist prepares a 30-cc. syringe with an 18-gauge needle for the surgeon to obtain blood from the aorta above the aneurysm.

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l. Technologist brings up a medium basin with graft to surgeon who will inject the blood through the end of the graft in a pulsating manner.

m. Surgeon assures that graft is thoroughly saturated with the blood for preclotting. The graft is set aside in a safe place until time for use.

n. Anesthesiologist gives intravenous heparin sodium, dosage calculated according to the patient's weight.

o. Surgeon clamps iliac arteries with angled peripheral vascular clamps three (3) minutes after I.V. heparin has been given.

p. Surgeon clamps the aorta above the aneurysm with Crafoord, Cooley, or Satinsky clamp.

q. Technologist should be ready with No. 11 knife blade on a No. 7 handle, heavy scissors, and cautery for opening of aneurysm.

r. Surgeon opens aneurysm and removes atheromatous plaque.

s. Surgeon excises the anterior wall of the aortic aneurysm using Metzenbaum scissors and vascular tissue forceps. The posterior wall of the aorta is left intact to reinforce the graft and suture line.

t. Surgeon controls bleeding from lumbar arteries using bulldog clamps or right angle clamps and heavy ties.

u. Surgeon cuts pre-clotted graft to appropriate size and begins anastomosing graft to aorta using a double-armed nonabsorbable vascular suture.

v. After completing the anastomosis, surgeon flushes the graft by releasing the aortic clamp for 2-3 seconds to demonstrate adequacy of the suture line and to flush out clots. Additional sutures may be used if leakage at the suture line occurs.

w. Surgeon opens distal vessels and inspects for backflow of blood.

x. Surgeon extends graft to iliac arteries in order to measure length and cut off excess graft limbs.

y. Surgeon anastomoses each limb of the graft to the iliac artery, using smaller vascular double-armed suture and similar technique as the aorta.

z. Before each limb of the graft is totally anastomosed to the iliac artery, the surgeon releases the aortic clamp to permit blood to circulate through the graft.

Note: This technique is done to prevent clots and pieces of plaque from entering circulation in the legs.

aa. Anesthesiologist gives I.V. protamine sulfate to reverse action of the heparin.

Note: This is calculated kg. for kg. of heparin given.

bb. Surgeon inspects suture lines for leakage and repairs as indicated.

cc. Technologist takes first closing count as surgeon closes retroperitoneum.

dd. Surgeon closes the abdominal wound.

Note: Surgeon may irrigate with antibiotic solution prior to closure.

17. Procedure for an arterial embolectomy

a. Surgeon incises skin and subcutaneous tissue over the affected artery and controls bleeding.

b. Surgeon exposes artery and applies moistened umbilical tapes and angled peripheral vascular clamps.

c. Surgeon incises artery with a No. 11 blade on a No. 7 knife handle.

d. Technologist attaches a proper size saline-filled syringe to the Fogarty catheter and inflates balloon to check for patency.

e. Surgeon inserts Fogarty catheter into artery beyond the point of clot attachment.

f. Surgeon gently inflates balloon and slowly withdraws the catheter. The clot is removed from catheter.

Note: This may be repeated 2 or 3 times until surgeon is satisfied that all clots have been removed.

g. As backflow of blood is obtained, the surgeon applies a peripheral vascular clamp below the arteriotomy.

h. Surgeon usually flushes the artery by injecting heparinized saline through an irrigating Fogarty catheter.

i. Surgeon checks backflow of blood.

Information Sheet

j. If satisfied with backflow, the surgeon closes the artery with a small vascular double-armed suture.

k. Surgeon may irrigate wound with antibiotic solution.

l. Surgeon closes wound.

18. Procedure for a carotid endarterectomy

a. Patient is placed in supine position with arms at side and head turned to unaffected side and supported. Patient is prepped from the middle of the ear down the neck to the axilla. The right or left lower leg is also prepped in case a saphenous vein path is necessary. Patient is then draped. General or regional anesthesia is used.

b. Surgeon makes vertical incision along the anterior border of the sternocleidomastoid muscle. Incision is deepened with electrocautery and/or Metzenbaum scissors until the carotid artery and its bifurcation are exposed. Wound is retracted as needed with blunt-edged small retractors.

c. Surgeon mobilizes the common carotid artery and both branches (external and internal carotid arteries) with fine vascular tissue forceps and scissors.

d. Surgeon places moistened umbilical tape or vessel loops around the vessel to prevent the plaque from being dislodged.

Note: An internal bypass shunt (Javid) may now be inserted in the common carotid artery and the internal carotid artery to maintain cerebral blood flow. It will be held with tourniquets or ring clamps.

e. Anesthesiologist begins use of intravenous heparin.

f. Surgeon clamps the artery above and below the bifurcation.

g. Surgeon makes incision into the carotid over the plaque area with a no. 11 knife blade and extends incision with cardiovascular scissors (Potts).

h. Surgeon dissects plaque(s) from arterial wall with blunt dissectors (Penfield, Freer) and passes to technologist as specimens.

i. Surgeon irrigates artery with heparinized saline.

j. Surgeon closes artery incision with fine vascular sutures.

Note: A synthetic or saphenous vein patch may be needed if the artery lumen is too narrow. If a bypass shunt was used, it is now removed.

Information Sheet

k. Surgeon removes clamps in following order: external carotid, common carotid, internal carotid.

l. Surgeon checks for leaks and repairs with additional sutures or topical agents (Surgicel®).

m. Surgeon irrigates wound with normal saline, closes layers with sutures of choice, and dresses wound.

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Student Supplement 1—Review Anatomy of the Heart

Name ____________________ Date ____________

Directions: Identify the following structures of the heart, and place your answers in the blanks provided.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________

i. ____________________

j. ____________________

k. ____________________

l. ____________________

m. ____________________

n. ____________________

o. ____________________

p. ____________________

q. ____________________

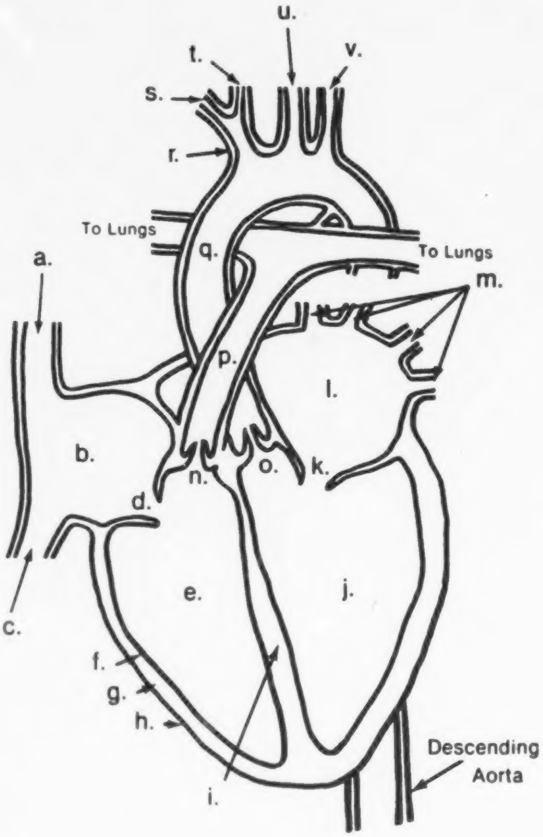
r. ____________________

s. ____________________

t. ____________________

u. ____________________

v. ____________________


u.
t.
v.
s.
r.
To Lungs
q.
To Lungs
a.
m.
p.
l.
b.
n.
o.
k.
d.
e.
j.
c.
f.
g.
h.
Descending Aorta
i.

Cardiovascular and Peripheral Vascular Surgery
Unit 13

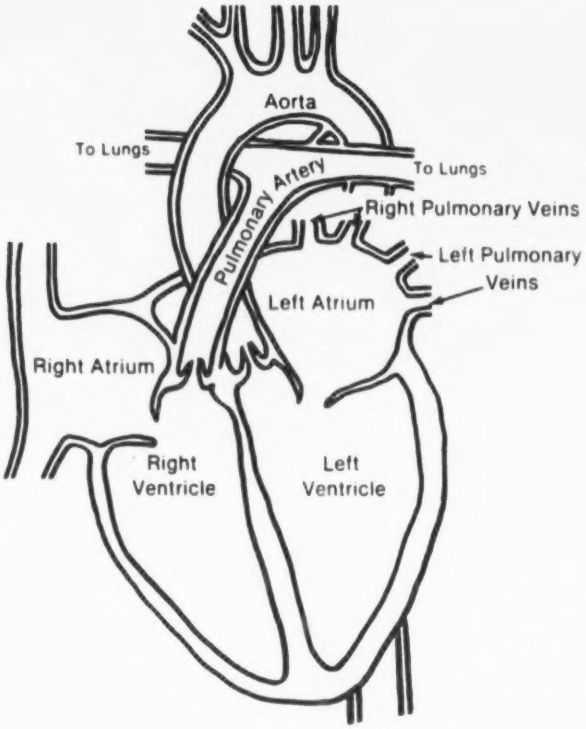
Student Supplement 2—Trace the Circulation of Blood Through the Heart

Name ______________________________ Date ____________________

Directions: Trace the circulation of blood through the heart in the illustration below. Begin drawing your arrows at the inferior vena cava. Use straight arrows to indicate oxygenated blood and wavy arrows to indicate deoxygenated blood.

Oxygenated blood ⟶

Deoxygenated blood ⇝


Aorta
To Lungs
To Lungs
Pulmonary Artery
Right Pulmonary Veins
Left Pulmonary Veins
Left Atrium
Right Atrium
Right Ventricle
Left Ventricle

Cardiovascular and Peripheral Vascular Surgery
Unit 13

Assignment Sheet 1—Determine Needs for Given Cardiovascular and Peripheral Vascular Surgery Cases

Name ______________________________ Overall Rating ______________

Evaluation criteria	**Rating**
Answers are appropriate	______
Descriptions use correct grammar, spelling, and punctuation	______

Directions: Read each of the following cases, and fill in the blanks with the appropriate information. Refer to the information sheets as needed.

Case A: A 67-year-old male is scheduled to have a permanent pacemaker implanted.

1. Describe one reason why this procedure would be needed. ________________

   ____

2. What position will be used for this surgical procedure? ________________
3. What are the two types of pacemakers that may be used? ________________ and ________________
4. What is the intended final location of the electrode? ________________
5. Where will the permanent pulse generator/battery be located? ________________

   ____

Assignment Sheet 1

6. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.

Case B: A 48-year-old female is scheduled for a carotid endarterectomy.

1. Describe one reason why this procedure would be needed. ____________________

____

2. What areas require prepping for this procedure? ____________________

____

3. Describe or draw the incision required.

4. Which artery (or arteries) will be incised to remove the plaque? ____________________

____

5. What special medication will be used as an anticoagulant? ____________________

Assignment Sheet 1

6. Draw a usable Mayo for this procedure. Instruments may be drawn or their names written in.